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(Gelatine Print issued only with Imperial Edition.)
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Sketches at Williamsburg, Va.
Bust of Mme, Morla.
Branch Bank of America, Philadelphia, Pa.
House, Cleveland, O.
Competitive Design for City-Hall, Lowell, Mass.

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BY special authority from the legislature, the city of New York is to be allowed the sum of four million dollars, or more, to be spent in renewing and repairing pavements during the next three years, and some of the daily papers are indulging in what appears to us very rash expectations as to the result of the expenditure of so much money. It is not that there is no one in New York who understands the art of paving streets, for from New York have come some valuable contributions to the literature of the subject; but an American who supposes that the lavish distribution of municipal funds implies any particular benefit to citizens in general shows an ignorance of "practical politics" which we should hardly look for in a metropolitan journal. In other countries the object of paving city streets is usually the diminution of the noise, dust and labor of traffic through them, and the systems which accomplish this result most effectually are those most favored by the municipal authorities. With us, on the other hand, the primary object of pavements appears to be the furnishing of employment to as many voters as possible, and for as long a time as possible, and that pavement is the most favored which provides this with most certainty. Next to the political value of a pavement, the most important point, according to the testimony of some of the persons who ought to know best, is the prospect of financial advantage which it offers to the persons who decide whether it shall be used, and in this respect the patented pavements offer attractions which are generally in inverse ratio to their value to the public. The proprietors of these patents, it is true, usually make brilliant promises about their goods, apparently as a sort of sacrifice to public opinion, but as the promises are not fulfilled, and the people in authority are quite willing that they should not be, the result to the public is simply the continuation of the costly and miserable system under which it has suffered for so many years. It is not so very long since we saw, for some days before an election, the watering-carts banished from Broadway, and their places supplied by a horde of men with watering-pots, for the avowed purpose of gaining votes for the party in power, and the inner history of the paving-departments of our large cities would probably afford more details of this sort of political management than any other branch of our public administration. Of course, it is useless to expect any real service to the public from such a system, and experience shows that the greater the amount of money to be distributed, the more shameless is the impudence with which it is stolen, or used to keep thieves in office. If the people of New York, or rather, those who rule them, really wish to extricate the city from its disgrace as the worst-paved city in the civilized world, they can easily do it by authorizing a commission of men who understand something about the matter, and who will not under any circumstances steal their fellow-citizens' money, to find out what is best, and have it applied to the streets in the best way, and at an honest price. It is hardly necessary to say that every other town that has tried the experiment thoroughly has come to the conclusion that natural rock-asphalt, on a concrete foundation, is the best pavement yet devised. In this country asphalt has been sedulously disparaged by persons interested in other pavements, and discredited by the failure of multitudes of pretended "asphalts," consisting of coal-tar and sand, but the fact remains that in certain places in New York and Boston, where the natural asphalt has been laid by private enterprise, it has resisted for years the heaviest traffic, while stone pavements around it have been ground into dust. With such examples constantly before them, joined to the experience of foreign cities, and the almost unanimous testimony of expert writers, it would be incredible, if it were not for the exigencies of politics, that the municipality of Boston should go on, year after year, shovelling soft sand and pebbles on its most fashionable streets, to be immediately reduced to a mass of filth, through which ladies wade and carriages plough, until it is dried up and blown away in dust, to be replaced the next year by another dose; or that New York should be content to receive its foreign guests into the unspeakable mire of West Street, with the cool explanation, to people fresh from Piccadilly or the Rue de la Paix, or the quais of Genoa, that the "traffic" of Beacon Street or Sixth Avenue renders it impossible to maintain anything on either of them but a pavement of soft mud. It is often alleged, as an argument against the use of asphalt-pavements in this country, that when wet they are slippery, and, therefore, dangerous to horses, but General Gillmore found this notion quite unfounded, statistics showing that the accidents to horses on asphalt pavements were no more frequent or more serious than on stone blocks, while the labor of traction, and the danger of distressing and overstraining horses, is far less. It would be well worth while, even if the benefit to the nerves of the citizens which would follow from the adoption of smooth-pavements, over which carriages, perhaps with rubber tires, like those now being introduced in Berlin, would roll almost noiselessly, were considered of no importance, for some one to reckon the saving to the New York express companies and teamsters of time and horseflesh incident to the substitution of a good asphalt roadway, kept clean, for the present pavements. Very little can be accomplished in this country for the public good in the abstract, but the mention of dollars would cause the express companies to prick up their ears, and such a demonstration as might be easily made of the unnecessary tax which they pay every year as a tribute to the ignorance and dishonesty of paving-departments would convert them into zealous friends of a reform which has been too long delayed.

WE all know something of the "brick-veneer" buildings so common in some parts of the West, and by no means unknown in the Eastern States, in which a frame covered with boarding is cased with a four-inch wall of brick, held to the boards by nails driven in the joints of the brickwork, but every one may not be aware that this, so far from being an invention of our own degenerate times, is a revival of a somewhat similar practice of, perhaps, the sixteenth century. In a lecture delivered some time ago by Mr. Lacy W. Ridge on the English half-timbered houses, the lecturer said that on the advent of the real Queen Anne style, which was nothing more nor less than an imitation of the buildings in Holland belonging to the Dutch friends of the Prince of Orange, the English proprietors of half-timbered houses who wished to conform to the new fashion very frequently veneered the fronts of their buildings with a brick façade after the Amsterdam pattern, leaving the half-timber work substantially intact behind it, where it may still be found by the curious architect. In the southern part of England a still simpler method of converting the antiquated wood framing into the new brick style was in vogue, consisting in the veneering of the wood and plaster work with narrow tiles made to imitate the face of a brick, and rebated at the upper and lower edges, so that they lapped over each other. They were made soft, as English bricks and tiles still are, so that they could be nailed through the upper edge, and the rebate of the tile above covered the heads of the nails. How the stone window-sills were managed in this case we are not informed. With our veneered fronts, the stone sills and lintels, if any are used, can be made four inches thick, and will stay in place tolerably well; but the art of making a stone sill half-an-inch thick, and nailing it to a timber construction, if it ever flourished, has been lost.

A CURIOUS scheme has been started in New York. Some one, who wishes, apparently, to combine the pleasures of being cremated and being buried proposes to build an immense "mausoleum," containing cells for forty thousand bodies, which are to be "desiccated" by a current of dry air, and preserved in this condition for an indefinite period. The advantage of being desiccated is that if a person does not happen to be dead when he is placed in the cell, the desiccation does not hurt him, as cremation or being buried would, and he can lie there comfortably, breathing the dry air, until some one comes to let him out. Another alleged merit of the system is that the faces of the people treated by it will remain "without discoloration or material change," so that their friends may have the satisfaction of seeing them at any time. The building is to be constructed of concrete, with a facing of stone, and might at least be made an imposing architectural object, whatever may be the success of the chemical processes involved.

M. FÉLIX NARJOUX has published a little book, containing his observations on modern Italy, as seen by an architect during a tour of professional inspection. Among other things, M. Narjoux gives some particulars in regard to building speculations in modern Rome which are curious, even to an American. In 1870, Rome was a quiet papal city of one hundred and forty-five thousand inhabitants, filthy, crowded and unhealthy. On the twentieth of September in that year the Italian national troops took possession of the town, after a few hours' bombardment, and its rejuvenation began. The Italian court first took up its quarters there, the King and his family occupying the Palace of the Quirinal, while the members of the suite accommodated themselves as best they could among the dirty rookeries whose owners were willing to take the invaders as tenants. With the court, however, came a multitude of merchants, working people, and others who had been dependent for their living upon the court patronage, and these found themselves almost without shelter. A demand for new houses arose in consequence, and building began in all directions. The increase of population often reached twenty thousand in a year, and the new-comers found homes for themselves, according to their rank and wealth, in various portions of the town. The northern suburb of the town, comprising the high region of the Quirinal and Esquiline hills, near the royal palace, was appropriated by the richer ones, and here were built the new railway station and such new Government offices as were found necessary; while the poor immigrants were obliged to content themselves with the territory around the Colosseum and the slope of the neighboring Cœlian hill, or seek more distant quarters near the Vatican; and the southern part of the town, beyond the Baths of Caracalla, was taken up by manufactories. The region of the Quirinal and the Esquiline, which contained the best houses, was the first to be built up. A wide street, the Via Nazionale, was laid out to connect it with the old portion of the city, and the price of land on this street increased enormously. Lots which were worth in 1870 about twenty cents a square foot soon advanced to six or eight dollars a foot, and, even after the speculation had got well underway, a building which was completed in 1880, at a total cost of sixty thousand dollars, was sold for eighty thousand, resold for one hundred thousand, then sold again for one hundred and twenty thousand to its present owner, who offers it for one hundred and sixty thousand, and is sure of finding a purchaser at that price. As usual in such cases, the best property has proved to be that used for retail business. While the huge apartment-houses, which were built in great numbers, have of late been unsalable and unrentable, the shops on the Via Nazionale grow every year more crowded with customers, and, therefore, more valuable to their owners and tenants; and even the old business streets, like the Corso, have revived, so that a lot on this street, which is to be occupied by a new dry-goods store, after the fashion of the Bon Marché in Paris, was sold for twenty dollars a square foot. It is curious that these new structures, which reoccupy the site of the busiest part of ancient Rome, are in many cases rendered very costly by the difficulty of obtaining a good foundation in the vast accumulation of débris which covers the ruins of the imperial city. It is not at all uncommon to find a distance of sixty feet between the present surface and the natural soil below, while the foundations of many buildings have been carried down seventy feet, so that the cost of the foundation often exceeds that of the entire superstructure.

THE Louvre has just come into possession of the tomb of Philippe Pot, one of the great Burgundian nobles of the fourteenth century, which has for a long time been one of the principal curiosities of Dijon, and, with its eight monks, with deep hoods, carrying the figure of the dead knight on their shoulders, is known from photographs and drawings to many of our readers. The tomb, which is one of the best existing specimens of the remarkable Burgundian school of sculpture of the thirteenth and fourteenth centuries, has had a rather singular history. It was originally set up in the abbey of Citeaux, and is supposed to have been the work of some of the monks of the convent. In 1791, as we learn from the account given in *La Semaine des Constructeurs* by M. Rivoalen, it was taken from the monastery to one of the churches of Dijon, which had been officially set apart as a repository of public property. Some time afterwards, in a way which is not explained, the tomb appeared in the hall of the residence of the Count de V., at Dijon, and here it remained without objection until 1886, when the descendant of the Count who first exhibited it as his own expressed a desire to sell it. When this was announced, the archæologists of Dijon took alarm, and endeavored to find some means of preventing the Count from carrying out his intention. The first step was to persuade the prefect of the Department of Cote-d'Or to bring suit for the recovery of the monument, on the ground that it was public property, which had been unlawfully removed from the State depository, and was subject to reclamation at any time. The first court which considered the case decided in favor of the prefect, but the Count appealed to a higher tribunal, which reversed the judgment of the court below, holding that the undisturbed and unquestioned possession of the tomb by the Count and his ancestors for eighty years or more, without any suspicion of having obtained it wrongfully, entitled him to the protection of the right of prescription granted by the Code. The Count, however, having established his right to the property, offered it at a reasonable price to the Administration of the National Museum, which immediately purchased it, and put it in the Louvre, with the rest of the fine collection of mediæval sculpture which is stored there.

THE wooden-nutmeg industry seems to have fled from Connecticut to establish itself at Cologne, where a manufacturer announces that since 1884 he has devoted himself exclusively to the construction of machines for making artificial coffee, and is now prepared to furnish these useful articles in any quantity. As an inducement to purchasers, he offers to present with each machine a recipe for preparing the material, and adds that although the sale of adulterated food is visited with severe penalties in Germany, there are many countries where such obstacles to trade do not exist, and where the enterprising possessor of one of his machines may enjoy the liberal profits due to the exercise of his skill, without fear of having his career interrupted by criminal proceedings. The material used in these machines is roasted Indian corn, or some other nutritious cereal, which, on turning a crank, is carved into grains so closely resembling those of the roasted coffee berry, after the usual grinding, that they cannot be distinguished from them, and can be sold for them without fear of detection, unless the buyer applies some chemical or microscopic test. Of the two, the microscopic test is by far the best. If suspected grains are thrown on ether, they will float for a time if genuine, but will sink immediately if composed of roasted cereals without further falsification, but by greasing the artificial coffee, so as to confer upon it something of the oily nature of the real berry, it will behave in the same manner under the test.

WE mentioned some time ago the frankness with which the editor of the *Wiener Bauindustriezeitung* spoke of the results of his investigation into the merits of the "Miraculous Carbon-Soda Stove," which he had had set up in his office for a thorough test. The memory of what he went through at that time in the pursuit of knowledge seems to have rankled in his mind, for we find in a recent number a note about the "suicidal stink-pot" known under the name of the "Miraculous Carbon-Soda Stove," saying that the Vienna authorities, in a special meeting, had ordered that the sale or use of the apparatus called by that name should be forbidden, on account of its dangerous properties.

OLD COLONIAL WORK OF VIRGINIA AND MARYLAND. — I.

WILLIAMSBURG. — THE TOWN.

THE ancient quiet of this old place, the residence-town of the royal governors and officers of the crown in His British Majesty's colony of Virginia, has been little disturbed by the irreverent onslaught of nineteenth-century progress, and as the English traveller, Burnaby, wrote of it in 1759, "a pleasant little town with wooden houses and unpaved streets," so will the modern wayfarer find it — an eminently respectable and highly conservative old burgh, proud of its vanished greatness and of its years. The railroad, which sets one down from Richmond or Hampton, merely skirts the outer edge of the town, and, being out of sight, obtrudes itself upon the general quaintness and age of the place only by the infrequent rush and clatter of a passing train. From the veranda of the inn one has a very agreeable first impression of a long stretch of wide "dirt-road," bordered by two rows of trees, and having a straggling, broken line of rather low and small old brick or wooden houses on either hand.

This is Duke of Gloucester Street, a pleasant, high-sounding old name, which invokes in the mind of the tourist in search of the picturesque a sense of lively gratitude toward the old burghers for not having christened their single important thoroughfare in the more usual commonplace way.

Williamsburg was founded, under its original name of Middle Plantation, in 1632, through an order granting fifty acres of land and exemption from general taxation to any one settling there.

In August, 1676, when General Bacon and his victorious army of rebels encamped there, it was only a small village of straggling little houses.

Bacon had driven Governor Berkeley to refuge in Accomack, defeated the Indians, and made himself master of Virginia. He now called a great convention together at Middle Plantation, and, after a powerful harangue and a stormy debate, which lasted from noon to midnight of August 3, persuaded those present, among whom were several members of the royal council and many "prime gentlemen" of the colony, to sign a declaration of their determination to stand by General Bacon, to "rise in arms against" Berkeley, who was denounced a traitor and a rebel "if he with armed forces should offer to resist the General; and not only so — if any forces should be sent out of England at the request of Sir William or otherways, to his aid, that they were likewise to be opposed" — and much more of a like revolutionary tenor. The scene was one of the most striking and significant in the early history of the colony.

In 1698 Governor Nicholson removed the seat of government from Jamestown, then "containing only three or four good inhabited houses," to Middle Plantation, where he planned a large town, whose streets were designed to form the letters W and M, in honor of their Majesties, William and Mary of England — a conceit never carried out.

Williamsburg was thenceforward the scene of the most important incidents in the growth of Virginia, and, though never attaining any greater importance as a town than it now has, was ever thought a pleasant place to live in, and has numbered among its residents or visitors many great and famous men.

A WREN COURT-HOUSE.

In the immediate foreground, as one looks westward up the long, wide street, lies the old "bowling-green," a generous, unenclosed square of smooth, close-cropped turf, on one side of which, and fronting upon the street, stands the court-house, a quaint little bit of architecture commonly accredited to Sir Christopher Wren.

The building is a simple oblong in shape, and of one story in height. The walls are substantially built of small English brick of a very pleasing dull-red color. The windows, high above the ground, are tall and narrow, and all the openings are crowned by semicircular arches, the dark, glazed brick used for header vouissoirs accentuating them in a simply effective way. The spandrels are now filled-in with painted boards, which have doubtless taken the place of the original round-headed sash and fan-lights. Where the thickness of the wall is reduced, at the floor-level, the offset is covered with a rounding moulded brick. There is a wide stone platform, with three steps to the ground, before the doorway, over which projects the roofed pediment of a portico, of which the columns are wanting. There is no evidence that they were ever in place, nor does the eye miss them greatly after it has had time to become a little accustomed to their absence, which is, at first, strikingly conspicuous. A wooden cornice, composed of a few simple mouldings, is carried around the building. The eaves have a moderate projection. The double-sloped roof is crowned with a tall octagonal lantern of graceful form, terminating in a wooden finial surmounted by a wrought-iron vane of rich workmanship. On the stone steps are grouped some idlers, listlessly talking and chewing as they bask in the faint November sunshine. Court is in session within, and, as we pass, the crier comes out upon the platform and calls aloud in booming tones a string of names.

The trees which stand beside the walk all up and down the street are very beautiful and effective in shape, and all the more interesting when one learns that they are mulberries, and the relics of a craze which from time to time played a not insignificant part in Colonial Virginia, and, in fact, throughout all the thirteen colonies. Attempts to grow the silk-worm were renewed again and again in spite of failures, and the successive trials were continued over a period of about one hundred and sixty years, reaching down to the beginning of the Revolution. Mulberry trees were planted everywhere. One finds them in numbers about the great old manor-houses on the river, and here they picturesquely adorn the Duke of Gloucester Street in the capital itself. The craze came over from England, as did everything else in those days, where it originated in an effort of the merchants to escape the paying of good English gold for shining silk, — that coveted product of fair France. The

Jamestown people had a try at the mulberries, and sent some silk to England, creating a tremendous excitement among the enthusiasts "at home," and so encouraging the hopeful that, in 1620, a lot of French silk-growers were sent out to give the experiment a fair trial in Virginia. Nothing seems to have come of this enterprise, and the stirring times of the Indian massacre of 1622 doubtless drove the skilled "mounseers" away to sunny France again.

Charles the First was always interested in the silk-growing, which he encouraged in his own ineffectual way. It went on under the Commonwealth, and we find good Edward Digges, in 1655, turning out as much as four hundred pounds of fine silk. Later, the House of Burgesses passed a law requiring the planting of one mulberry-tree to every ten acres of land. Great rewards were promised successful growers. In 1668 we hear of three hundred pounds sent over as a present to Charles the Second. Then there came a period when the caterpillars languished and died, and the Burgesses undid the law as to the compulsory planting of mulberry-trees. There was another mulberry revival when the Huguenot refugees came over, and in 1730 more silk was sent home to England; but nothing came of it all at last, except the grand old gnarled and knotted boles and spreading branches of the trees, which we find composing effectively into foregrounds in these ancient places.

CHRIST CHURCH, BRUTON PARISH.

Not far beyond the court-house is old Bruton Parish Church, standing within the walled enclosure of its "God's acre," and rearing its graceful, Wren-like tower amid the spreading branches of the ancient trees. Our eighteenth-century Englishman, Mr. Burnaby, has set down old Bruton as "an indifferent church," but then it was comparatively new in his day, and had scarce yet felt the beautifying touch of time.

The vestry-book of the parish of Middlesex in the year 1665 contains an entry directing the building in Middlesex of a church similar to the church of Bruton Parish. That this was a wooden building seems likely from an entry in the Bruton records of 1678 giving the list of donors to a new brick church, headed by John Page, who gives twenty pounds in money and the land for church and churchyard. The name of Bruton seems to have been originated by Mr. Sudwell, who so called the parish in memory of his birthplace at Bruton, in Somerset, England. He also gave twenty pounds toward the new building, and Philip Sudwell twenty pounds, and many others gave five pounds. And John Page was allowed to put up a pew in the chancel, where there was also one for the minister.

As soon as the church was dedicated, the vestry made it known in the community that it was intended to enforce the penalty of so many pounds of tobacco against those who failed in their attendance at church, and it is to be presumed that delinquents were few thereafter.

There seems to have been from the first a great struggle between the royal governors and the church people as to the induction of their ministers. The Governor, as representative of the King, was the nominal head of the church, and, as such, claimed the right of the appointment of ministers, and was otherwise inclined to interfere with the functions of another great personage, the Commissary of the Bishop of London. There was much unseemly squabbling over this matter between these rival powers. In 1696 the salary of ministers was fixed at sixteen thousand pounds of tobacco, in lieu of £100 per annum, which, the parishioners had complained, they were unable to pay. The incumbents of Virginia livings were not, as a rule, men of a high order, if we may believe the traditions of their profligacy. One is said to have fought a duel in his churchyard to settle a quarrel at cards, another thrashed his contumacious vestry, and then preached them a sermon celebrating his victory: swindling of tradesmen, gambling, and attendance at horse-races and cock-fights seem to have been quite common among them, and, finally, the evidence is unmistakable that they all, to a man, got gloriously drunk at dinner whenever they could. These, indeed, were the manners of the times, and perhaps the worthy parishioners were not so shocked as one might suppose by this unministerial behavior of their clergy. However, the faithful continued the struggle with the governors until they finally won the right of hiring their parsons from year to year, a system which, no doubt, largely increased the godliness of deportment and improved the odor of sanctity in these reverend gentlemen.

By all odds the most distinguished churchman of colonial times, in Virginia, was James Blair, Rector of Bruton Parish, from 1710 to 1743. He was the founder and first president of William and Mary College, and Commissary to the Bishop of London. His parish of Williamsburg, or Middle Plantation, was reported to the Bishop of London, in 1723, as ten miles square. His ministry "commenced," says Meade, "under the administration of Governor Spottswood, and with a tender from the Governor to the vestry of aid in building a new church, the plan of which was sent by him, and is, I presume, the same with that now standing. Its dimensions were to be twenty-two feet, with two wings, making it a cross as to form. The Governor offered to build twenty-two feet of the length himself."

Blair was the most energetic of men, and always foremost in the affairs of Church and State. He kept up an endless warfare against the royal governors in matters relating mainly to the church, and he defeated them in succession and single-handed. Even the genial and cultivated Alexander Spottswood, that distinguished soldier and most accomplished gentleman, did not long live in amity with the staunch and invincible old polemic, and, as the Governor himself admits, it was not the parson who was worsted.

Blair's quarrel with Sir Edmund Andros was a famous one, and he fairly drove the successor of Andros, Sir Francis Nicholson, from the colony.

Bruton Church is really very beautiful. The gable on the east end is densely covered in ivy, and the suns and storms of many years have so mellowed and harmonized the whole that one is incapable of criticising the church in detail. No doubt it is, after all, but an indifferent affair, as our friend, the Archdeacon Burnaby, insists, but the softened, warm, yellowish-red tone of the old bricks, the simple dignity in the lines of the building and the fair proportions of the old bell-tower, the clinging ivy, the background of fine old trees, of grassy yard and mouldering mossy tombs, all so eloquent in the tender loveliness of age, unite in a picture which has in it a good bit of old England, and is full of quiet charm. The tin roof which replaced the ancient shingles was an unhappy mistake, and we may hope that the better taste which now controls the parish will, some day, restore the nobler covering. Going in through one of the wrought-iron gates set in the low wall of brick which surrounds the churchyard, one wanders among the tombs in that subdued enjoyment of the solemn beauty of the place found only in an ancient

garden of the dead. Here are some quaint old stones, rich in sculptured heraldic device, and bearing, in graceful, antique letter, stately tribute to the deeds and virtues of the sleepers beneath.

Here, under a twisted mulberry in the southeast sunny angle of the wall, lies "Barradall, armiger," beneath a tomb blackened and seamed with age, but very good in design, and bearing a splendid sculptured crest and a Latin eulogy of that worthy jurist of the colony, upon the flat top stone. And not far from the tower, at the western end of the church, among a group of the larger tombs, is the very noticeably handsome monument erected by a grateful colony to the memory of Edward Nott, late their Governor, "a lover of mankind and bountiful to his friends," who died August 23, 1706, at the age of forty-nine. The lettering of this inscription is particularly good, and the armorial bearings carved above it are rich in scrolled foliation. At the head and foot and on the sides of the tomb are relievos in white marble carved by a well-skilled hand. These handsomely carved marbles were, of course, brought over from the mother country, the work being of much too fine a quality to have been executed in the colony. Edward Nott was the first deputy of the Earl of Orkney, who was made Titular-Governor of Virginia, in 1704, but never came out to his province. Nott's administration lasted only two years, and he died in office, having won the affection of the colony by his wise and beneficent government.

The large white marble monument of the Bray family, close by, is also very imposing. The larger tombs are being cleaned and restored in a very satisfactory and intelligent way under the auspices

of the lady parishioners of Bruton. Those of Nott and Bray have been lifted out of the ground into which they had partially sunk, and their carvings have been cleaned so as to reveal the beauty of the work, without, however, losing the inimitable mellow tones with which old time has glorified them.

In another part of the yard, lying half-hid among the long grass, is a plain gray slab of stone setting forth in eloquent simplicity that "Here lyes the corps of Hugh Orr, hammerman in Williamsburg — 1764" — and many graves there are unmarked by stone or mound, most eloquent, perhaps, of all.

The interior of Bruton has little to reward the eye of the curious. There is, to be sure, the alleged, and doubtless perfectly authentic, Pocahontas font, in which they baptized the wild princess after they had talked her into becoming a Christian, and the wife of John Rolfe. There is, also, some interesting communion-plate belonging to Bruton parish: the Jamestown service, presented by one Morrison to the old Jamestown Church, is of heavy silver, rather crudely fashioned, and probably made in Jamestown, where there were capable artificers, sent out among the original companies. The "Queen Anne" service is of gold, and richly chased with the arms of Beauchamp, and of another family. The work is said to have been done by Harache, a French *emigré*, who had been in the employ of the great Marlborough. The third, a heavy silver-service, was presented to Christ Church, Bruton parish, by George the III; it bears the royal arms handsomely chased on flagon, chalice and paten, and is delicately wrought upon the edges with a shell design. Drawings of these sacred vessels may be seen in Buck's "*Old Plate.*" Architecturally, the interior of the church contains very little of interest. It is, however, rich in historical associations, and the imagination easily peoples the old place with the phantoms of departed greatness.

Up there, in the gallery, sat the "quality," in the older time, when they came in their great state-coaches to church from their plantations on the York or the James. From Rosewell, over on the York, came the great Page family, the descendants of Colonel John Page, who, as we have seen, was one of the original patrons of Bruton. At their splendid house of Rosewell, and on their neighboring estate of Shelly, the Pages lived like the grand seigneurs they were. The old Indian name of Shelly was Weromocomoco, and it was here that grim, old Powhatan set up his court, and feasted in royal state upon the luscious oysters of the York. The Pages were great churchmen, and staunch upholders of the Establishment. Their estates were of vast extent, and Matthew Page, adding to them the great adjoining tract of Timber Neck, in 1690, by his marriage with Mary Mann, broadened the family acres into a princely domain. Mann Page, his son, built Rosewell-house, in 1725, having brought the bulk of the material from England, as was usual in that time. Rosewell is ninety feet square, an imposing pile, and the interior was finished in all the elegance of wainscoted walls, mahogany stairs and carved mantels.

The building of these splendid and costly manor-houses in the infant colony, as yet hardly more than the unreclaimed wilderness, was a curious instance of the ostentatious grandeur of the period, exaggerated as it was among these lordly planters of Virginia who emulated the pride and luxury of their English prototypes.

Despite the wildness of the life they led, their society was distinguished for courtliness of manners and for a boundless hospitality, the traditions of which is still an active principle in the households of their descendants.

Educational facilities were very limited in the colony. The sons of the richer families were sent to William and Mary, or to England. Outside of these two resources there was nothing. But, after all, they picked up somehow enough learning to fit them for the management of their great plantations, to look after the growth and final sale of the great staple, the tobacco-crop, and to direct the training of their negroes in the trades and avocations of varied kinds exercised upon the larger places, to see to the importation of the household necessities and luxuries from England, and, above all, to acquit themselves gallantly at race and rout, in the parlor or the woodland camp. To the personal beauty of the women who graced their homes canvases by many a famous hand bear witness, and that they practised all the domestic virtues in a high degree in the midst of the reckless living, the prodigal hospitality and wild profusion of the times, we have, also, the amplest testimony. Then, as now, the reputable wayfarer in the Old Dominion found every door open to him, and warm-hearted entertainers eager to house and feed and help him on his journey. The taverns were small, comfortless grog-shops. The plantations were isolated, and, as there were few roads worthy the name, communication between them was mainly by the rivers upon which all the great places were located. As the country became more settled and roads were opened, the planters went in for fine horses, and set up their studs of hunters and racers, often bred from famous imported stallions of great value. Their equipages were of great splendor. General Spottswood, living in retirement at Yorktown, advertises in the Virginia *Gazette*, in 1737, to sell his "coach, chariot, chaise and coach-horses," and "one of the best-made, handsomest and easiest chariots in London." And so the great people rode in state in their family-coaches to church, with pomp of sleek-coated, prancing coach-horses and splendor of glittering crested panels.

And, standing here in the warm sunshine in the doorway of the ancient house of God, we may fancy the Rosewell coach reined up at the gates, and discharging its aristocratic burden of satin-robed beauties and brave gentlemen on a bright May morning in the later colonial times; and we may see young Mr. Jefferson, at present an undergraduate of old William and Mary, stepping down, to hand out with graceful empressment, the lovely mistress Rebecca Burwell, whom he adores just now, and who had the distinguished honor of refusing the embryo statesman's heart and hand somewhat later. We will picture Mr. Jefferson to our imagination as a rather slim and callow youth, at this time, with curling locks of rufous gold, debonnair, and of courtly manner. With him is his friend, John Page, of Rosewell, his chum at William and Mary, and the fellow-patriot with whom he listened to the denunciatory thunderings of Henry in the House of Burgesses, and sweet Anne Randolph, and his friend, Ben Harrison. As they enter the old church, wherein their ancestors have worshipped for generations, and, with rustling of skirts, preening of feathers and smoothing of rumpled laces, march to their seats among the aristocrats in the gallery, the admiring commoners look on from their places on the floor below.

Williamsburg was always the great centre of fashion in the old colony times. The "season" lasted during the session of the House of Burgesses and the Supreme Court, and when the time arrived for the meeting of those august bodies, every considerable planter in the country roundabout bundled his family into the great state coach-and-six, and drove up to the Capital for a few weeks of brilliant gayety.

The Royal Governors and other officers of the Crown vied with one another, and with the citizens, in the splendor and luxury of their dinners and balls. There were horse-races and many other sports, and gambling ever fast and furious, and now and then, at dawn of day, there was the gleam of crossing swords or the flash in the pan of a duelling-pistol out behind the town, on a sequestered bit of turf beneath the trees, where hot-blooded gentlemen settled the undetermined issues of the night, of love or play. There was feasting and dancing at the Raleigh Tavern, and the plays of Shakespeare and Congreve were given by the "Virginia Company," from London; and thus pleasantly did the life of the old capital roll on up to the sterner times of the Revolution.

But, whatever wild gayety and riotous dissipations may have filled the week, old Christ Church of Bruton received them within her venerable walls when the Sabbath came round, and with becoming decorum these aristocratic squires and dames and beaux and belles, of the younger England, listened to the word of God in the old fane of their forefathers.

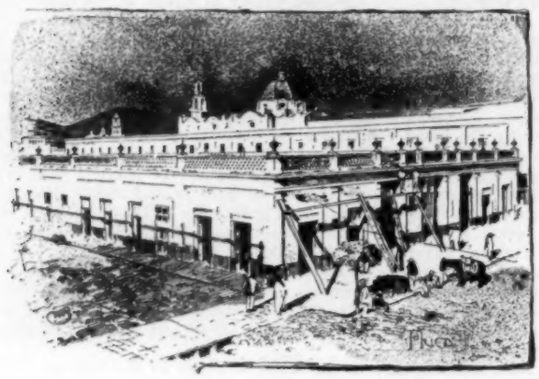
A. B. BIBB.

(To be continued.

PUGET INLET TIMBER BELT. — A lumber pile made of boards each 100 feet long and 6 feet in width would be an unprecedented sight in the East, but a gentleman recently returned from a visit to the coast of the North Pacific Ocean, says, that piles of lumber such as that are common at the mills on Puget Sound. "Boards 100 feet long and 6 feet wide, without a knot in them," he said, "are common cuts from the gigantic fir trees of the Puget Sound forests. These trees grow to the enormous height of 250 feet, and the forests are so vast that although the saw-mills have been ripping 500,000,000 feet of lumber out of them every year for ten years, the spaces made by these tremendous inroads seem no more than garden patches. Puget Sound has 1,800 miles of shore-line, and all along this line, and extending thence on both sides miles and miles farther than the eye can see, is one vast and almost unbroken forest of these enormous trees. There is nothing like it anywhere on the Pacific coast. An official estimate places the amount of standing timber in that area at 500,000,000,000 feet, or a thousand years' supply, even at the enormous rate the timber is now being felled and sawed. The timber belt covers 30,000,000 acres of Washington Territory, an area equal to the States of Vermont, Massachusetts, Connecticut and New Hampshire. The markets for the Puget Sound lumber are entirely foreign, being South America, Australia, Central America, and the Pacific Ocean islands." — *Philadelphia Item.*

AUTUMN JOURNEYS IN MEXICO.[1]—V.

TO TOLUCA AND BEYOND.

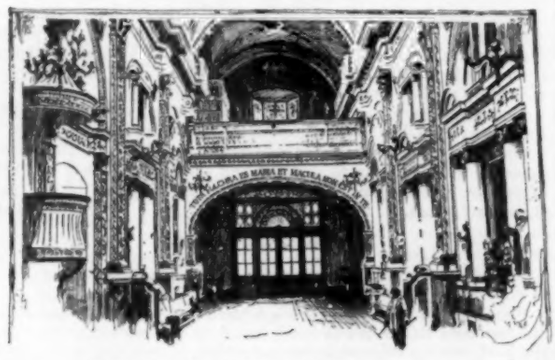


Plaza del Mercado, Toluca, Mex.

OCCASIONALLY one meets in Mexico would-be sightseers who feel aggrieved that Mexican towns should be old and somewhat out of repair, upon whom the picturesqueness belonging to age and historic association is lost, and who express themselves as though disappointed at not finding the City of Mexico fresh from the hands of a modern architect. What preconceived ideas of Mexico they had, or what led them to journey towards that country it would be difficult to guess, but being there they might find in Toluca that newness and freshness which would in part atone for their disappointment over the age and decay of some of the other towns. For only a few years ago the Tolucanos developed a fondness for rebuilding and modernizing and the result has been the remodelling of all their public buildings and that has stimulated the possessors of private buildings to fall into line, and now Toluca presents the appearance of a new city. It is the capital of the State of Mexico, and no better sign of the prosperity of that State can be found than in the comeliness of the buildings in which the officers of State transact their business.

Glaring discrepancies, startling contrasts, annoying incoherencies are very apt to occur where this process of rebuilding, in part, an old city goes on. But the architects of Toluca were wise in their generation and have avoided all such perils. When they set out to replace the severe and monotonous fronts, which are characteristic of Mexican architecture, with newer and more ornate styles, they sought their models not in the English of two and three centuries ago, not in the French, with its mansard roofs, not in the Russian, long, cold-winter style of architecture — but in Greece.

The result is most pleasing. The buildings retain their former arrangement which was adapted to the requirements of the climate,



Interior of the Church of Our Lady of Carmen, Toluca.

the chief feature of which is the *patio* or open court, and the Roman arch is extensively used. In one case, however, a Grecian temple has served as a model for a building. It is the Municipal School near the Church of Our Lady of Carmen. It is a perfect little gem of architecture, save that it occupies a site below the level of the street upon which it fronts. A little filling-in of the lot (it stands a hundred feet or so back from the street), would have made it the most satisfactory building of its kind in Mexico. The new market is an exception to the prevailing style of architecture in the new Toluca: it is Pompeiian, the interior painting especially. It is beautifully neat and clean, a great rarity in Mexican markets, and is worth a visit. But Toluca is a remarkably clean city throughout. It has a good natural drainage and its streets are so constructed as to allow the water to run off without obstruction.

But it must not be supposed that in their efforts to renew the Toluca nos have lost all reverence for antiquity. Not so. Witness many a quaint bit of old architecture to be seen in and about the city. Witness more particularly a passageway leading from a street to the parish church of San Francisco, not at all conforming to the plan of that church as it now stands, but nevertheless preserved, as we are informed by an inscription upon one of three archways therein, that they may remain as relics of the first Catholic temple ever erected in Toluca. Among the new public buildings in the centre of the city are the foundation walls of what is to be a large and magnificent church. It is more than fifteen years since the work was begun. Elsewhere in Mexico there are scarcely any churches in process of erection, and only of late years have any been restored. It may be significant of the enjoyment on the part of the Romish Church in the State of Mexico of immunity from the oppressive attitude which the Government has assumed towards the Church elsewhere. Toluca is not especially a city of churches as most Mexican cities are, but the few churches which the city possesses are worth visiting and contain some good paintings. The Church of Nuestra Señora del Carmen, has a rococo interior, but its chief interest lies in its curious old furniture, and its small organ which is probably the first organ made on this continent.

Toluca is situated in a valley of the same name, over eight thousand six hundred feet above the sea-level and dominated by the extinct volcano, Nevada de Toluca. Only one city in the Republic is of greater altitude. Its population is about fifteen thousand. It is reached by the Mexican National Railway from the City of Mexico, distant about forty-five miles. The railway has recently become a highway between the cities of the United States and the Mexican capital.

The journey up from the City of Mexico is delightful. Leaving the valley of Mexico the road enters the mountains on the west and winds around among them in making its ascent to Cima, which is exactly ten thousand feet above the level of the sea. Thence the road gradually descends but in the same circuitous manner, affording magnificent views all along of maguey plantations, picturesque villages, and wild mountain gorges. The train runs along the side of the mountain directly over Ocoyoacan, so that the passenger may obtain a bird's-eye view of that curious town.

Beyond Toluca the Mexican National continues its way to other interesting cities, and through a country where the retention of Indian names, such as Tlalpujahua, Tepetongo, Chapatuato and Zintzuntzan, attest that the native races still exist there. This region was the seat of the Matlatzinca Indians before the advent of the Aztecs. Morelia, two hundred and twenty miles from the City of Mexico, is the beautiful capital of the State of Michoacan. Being too far off from the City of Mexico to have suffered very much from the violent "reform" of 1860, or to be influenced by the anti-Catholic tendencies of the leading men of the Mexican metropolis, Morelia remains a stronghold of Romanism. Its claims upon the attention of the historian are based upon its having furnished birthplaces for two of Mexico's revolutionary heroes, Iturbide and Morelos, and a suitable place for the execution of the patriot Matamoras, in 1814. As evidence that republics are not always ungrateful, the house in which Morelos first saw the light and that in which he lived for a time, are each marked with a suitably inscribed tablet; and it was to perpetuate his memory that the name of the city was changed in 1828 from Valladolid to Morelia. The cathedral in Morelia, in the style of the Spanish Renaissance, occupying an entire block, is well worth seeing. Its interior decorations of carved wood, Mexican onyx and some silver are especially interesting.

Still farther off toward the northern terminus of the Mexican National is the town of San Miguel Allende, interesting in many particulars, but principally on account of its recently restored church. It is the only approach to the Gothic, so far as I know, in Mexico. The strangest thing about it is that the restoration was the work of a native of San Miguel who had no architectural training whatever, and traced all of his working-drawings upon the ground where his masons were at work. The only comment to be made upon his success in such an undertaking is, that it is greater than would naturally be expected.

Arthur Howard Noll.

(To be continued.)

[1] Continued from No. 679, page 299.

THE ILLUSTRATIONS

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

CHRIST CHURCH, BRUTON PARISH, WILLIAMSBURG, VA.

[Gelatine Print, issued only with the Imperial Edition.]

See article on "Old Colonial Work in Virginia and Maryland," elsewhere in this issue.

MINERS' HOSPITAL, HAZLETON, PA., MR. BENJAMIN LINFOOT, ARCHITECT, PHILADELPHIA, PA.

THIS is a State Institution for accident cases only and comprises a central administration building, running north and south, and two large general or so-called "open wards" connecting with the same

and running east and west. The administration building contains on the first floor to the right of the entrance a patients' reception-room and the apothecaries' office and bedroom, the apothecaries' office being connected by a private stairway with the basement, where the bulky supplies for bandages and other purposes will be kept. To the left of the entrance is the board-room. The bay alcove leading from the same will be occupied by the superintendent's desk. Next to the board-room comes a private stairway, leading to the resident faculty's apartments in the second story and the patients' dining-room, with a pair of dumb-waiters connecting it with the kitchen and pantries in the second story. Back and to the right of the cross hall is the receiving and operating room and to the left the kitchen entrance and stairway, hoist and conveniences for the working staff. In the cross halls connecting the wards with the central building are located the patients' sitting-room on the one side and a pair of isolated wards on the other, the remaining space being devoted to nurses' rooms, linen-rooms, patients' wardrobes and dirty-linen shutes, these latter connecting with the basement. In the extreme ends of the large wards are situated the patients' baths, wash-rooms, water-closets and two glass-enclosed porches to be used in the winter as sun-parlors. The second floor front is to be occupied by the resident physicians, and comprises a sitting and bed room for each and a dining-room common to both suites of rooms; a coroner's-jury room and the back portion of the floor to the kitchen, scullery, pantries, store-room and servants' dining-room. The third floor is devoted entirely to the help, the front portion to bedrooms and the back to the laundry. The boilers are contained in a separate building in the rear of the main structure, but connected with the same by means of a duct underground all walled up and arched over. This annex also contains the dead-house and the place for holding autopsies.

All the internal constructional walls are of brick and the stairways of iron, the exterior foundation walls up to the water-table all being built of local stone and the superstructure will be of brick and terra-cotta, relieved with Indian limestone heads and sills and bands of Cleveland buff brick. The roof will be covered with the best Lehigh slate, the ridges covered with terra-cotta cresting and the tower with galvanized-iron and copper finials.

The floor area of the open wards is 2,430 feet, or 101 square feet to each bed, and the wards being 18 feet high, the patients have each 1,404 cubic feet of air. In the isolated wards the quota will be a little in excess of the above figures.

The heating and ventilation will be accomplished by means of two Blackman disc-fans, one for driving the heated air into, and the other for exhausting the vitiated air out of the various wards and other apartments. These fans will be driven night and day, winter and summer, in the latter instances of course forcing and changing the air at the outside normal temperature. The plant is designed to be capable of changing the entire atmosphere in all the first-story rooms and wards once in every twenty minutes and all the second and third story rooms once in every thirty minutes and in zero weather to maintain a steady and continuous heat throughout the interior of the building of seventy degrees Fahrenheit.

The steam power will be furnished by two thirty horse-power horizontal tubular boilers, one for supplying the heat and the other for operating the engines, driving the fans and laundry-machinery and also the pumps. One of the latter will be a Deane double-acting fire-pump, with ten-inch cylinder, three-inch suction and two-inch discharge. This is to be arranged for filling the tank in the fourth story for supplying the building with water and also for sprinkling the lawns and, should the emergency arise, for fire purposes.

The laundry will have a complete outfit of rotary washers, centrifugal dryer, starch digester, blue-tubs, drying-room, French mangle, etc.

The total accommodation is fifty beds (all males) and the cost $60,000 or $1,200 per bed without furniture.

SKETCHES AT WILLIAMSBURG, VA., BY MR. A. B. BIBB, ARCHITECT, WASHINGTON, D. C.

SEE article on "Old Colonial Work in Virginia and Maryland," elsewhere in this issue.

BUST OF MME. MORLA. PORTION OF THE DOOR FOR THE MUSEUM OF DECORATIVE ART. AUGUSTE RODIN, SCULPTOR.

BRANCH BANK OF AMERICA, PHILADELPHIA, PA. MR. CHARLES W. BOLTON, ARCHITECT, PHILADELPHIA, PA.

ALTERATIONS FOR N. W. TAYLOR, ESQ., CLEVELAND, O. MR. CLARENCE O. AREY, ARCHITECT, CLEVELAND, O.

COMPETITIVE DESIGN FOR CITY-HALL AND LIBRARY, LOWELL, MASS. MESSRS. WAIT & CUTTER, ARCHITECTS, BOSTON, MASS.

AUGUSTE RODIN.[1]—X.

[The following comments on Rodin were furnished the writer by one of the ablest of the younger French sculptors.]

Female Satyrs. Upper Right-hand Corner of Door. Auguste Rodin, Sculptor.

"RODIN'S life, since he came to Paris, in 1877, is an old story in the history of French art, but none the less interesting because it has been so often told. Every forcible, original and living artist, from Delacroix down, has had the same obstacles to contend against. They are in human nature. It is the way things go.

"'The Age of Brass,' when it appeared in the *Salon* of 1877, was such an astounding piece of modelling even to the best sculptors, that we were all completely taken off our feet. Those who could not explain its existence by the ordinary process of making sculpture, were obliged, in spite of themselves, to say that it must be a cast from nature, a trick by no means rare in these days. I don't think that the men who made this accusation against Rodin, really knew or thought at the time what they were saying, or were conscious of the gravity of the charge. They had to say something. No one thinks so now. The appearance of this statue, and that of its immediate successor, 'The St. John,' was the loudest clap of art-thunder that has been heard in France for a hundred years. Usually it takes about fifty years, in France, for a real work of art to get a hearing. Such statues are too much for the general average of artists, and those who occupy themselves with art.

"It is curious to observe that but very few of the historical writers on art have said anything about Rodin. He must die first. Rodin came by an unauthorized route. He is not a graduate of the School, and his work must first be hated. Every master and every real masterpiece that we have got in Paris has passed through the same experience. When Rude's great bas-relief on the Arch of Triumph was first shown to the public, it was universally condemned, and so was his statue of Marshal Ney, more especially by the sculptors of the School. The same was true of Carpeaux's groups on the Tuileries, and if Lefuel, the architect, had had his way, they would have been taken down. Carpeaux went to the Emperor and complained against Lefuel's intentions, and the result was that they were preserved. The sculptor's group on the Opéra was generally condemned, and even the architect did not like it. It took seven years, and the death of the sculptor, before his group of the 'Four Quarters of the World,' for the fountain of the Luxembourg Garden, was accepted by the city. Fremiet's equestrian 'Joan of Arc' had no more bitter opponents than the artists of Paris. So bitter that they talked of petitioning the Common Council to take it down.

"Great art in France has had a strange history, especially in modern times. All of her strongest men have been more or less martyrs to her voluntary neglect, instead of children of her care. Barye, Corot, Millet, Rousseau and many others are examples. Those men owe nothing to their country. Courbet, the greatest painter of modern times, was persecuted like a criminal, and driven to exile and death by his own country's government. A mighty spirit, who, though going out in disgrace, left a wake of glory behind him for future ages to glorify.

"Barye received the accustomed marks of distinction from art authorities, but they neglected to encourage his genius. The personality of Barye, as shown in his works, was repellant to all prevailing art interests, and the principles upon which those works are made are almost wholly ignored.

"It was a personal, not a national influence that recognized Rodin. A few artists saw his merits and had the courage to extol them. It needed an unusual independence on the part of Turquet to have anything to do with Rodin, as he ran the risk of offending all of our art authorities. Turquet was an independent in art matters, and acted for the interests of the best art. He did an immense deal of good; was a valiant friend of Rodin, and deserves all praise. The *Salon* jury would only give Rodin a third-class medal, while he ought to have had the Medal of Honor when he exhibited 'The Age of Brass' and 'The St. John.' But Turquet bought the statues all the same. It is perhaps not too much to say that Turquet created Rodin. The commission for the door is the most important one of this century. Rodin made himself. His life has been a very hard one. I know by experience what it is to work for commercial sculptors. Nothing is more menial for a proud, sensitive, independent and simple nature. Rodin is all that, besides being a great artist. These sculptors are a rough set, and I can't imagine anything worse than for a man who had made, or was capable of making, a figure like 'The Age of Brass,' to be obliged to earn his bread by working for such employers. Yet Rodin was not alone. Brian, who made the finest piece of modelling in French sculpture, worked for commercial sculptors all his life. I remember when Rodin had only fourteen cents with which to get a meal. But

[1] All rights reserved. Continued from page 263, No. 701.

it is in this way that much of the greatest French art has been produced. Belleuse was the most capable of Rodin's employers, but he had no idea of the latter's ability. During the contest over 'The Age of Brass,' in 1877, and while Rodin was working for him, he not only neither expressed any interest or sympathy for Rodin, but said, when asked what kind of a fellow Rodin was, 'Oh, he is a good workman, but he copies anything and everything that he happens to see.' After Belleuse saw that Rodin was making friends, he got him to work at Sèvres, and asked Rodin to make his bust, which Rodin did, and gave it to him. But even while doing that his way of working did not please Belleuse, and the latter used to exclaim in half-indignation, 'Sacred name of Rodin, he has worked for me for ten years, and I have not been able to print myself upon him. He will never be able to model as I want him to.' Besides the annoyances of working for ignorant employers, there is the degrading influence of bad methods. How Rodin lived through it all, and escaped its demoralization is indeed a wonder. That he did proves him to be possessed of immense individuality, and a tenacity of purpose unsurpassed. The best half of his life was passed under these conditions. Night and Sunday work saved him from artistic and intellectual ruin. And all this for the sake of art.

"Barye and Fremiet were both more fortunate, for they got clear of this servitude much sooner.

"France is deservedly renowned in art, not by reason of a general art interest, but because of a few individuals. It is the same with Italy. The Renaissance represents centuries of Italian existence, yet it was made by a few men.

"France has never made her Delacroixs, Baryes, Millets, Rudes, Fremiets and Rodins. They have made her, and in spite of herself. They have made the sky of French art luminous — by suffering.

"What is sweeter than human sympathy. These men had to wring sympathy, courage and perseverance, out of misery, neglect and abuse. They seem to me more than mortal.

"The School would, of course, be Rodin's enemy; it was at the start, for he could not get into it. Seriously speaking, it can't be blamed, for no school or art organization can do much for personalities like his. It is beyond their scope. Each must look out for itself. Men like Barye, Millet, Rodin and others of similar nature, cannot be identified with any art organization, nor can the latter reach them. The purpose of a school of art, and all art societies, is to care for the average. They live, and are powerful for the day, but these men are forever. Schools are never sincere, sincerity is only with individuals. Genius has no worse enemy than those who assume to be learned. Neither are such men taught, either by schools or themselves; they observe, are inspired and grow. The growth and development of individuality is a personal matter. Our greatest men were not graduates of the School.

"Rodin has many enemies who say that his things are tortured shapes, without art, reason, logic or significance. The same has been said of all original minds. He is the only one of our sculptors who has a real understanding of the nude. His power of execution is prodigious. There is no one like him.

"The times, fortunately, have changed since forty years, more especially in regard to the writers on art. Then, there were but a very few who were not opposed to the great artists. Now, there are many who are on the look-out for, and are quick to recognize everything that is original, powerful and suggestive. As soon as they found Rodin, they supported him, and did not hesitate to proclaim his surpassing merits, as well as to protest against the injustice done him by the jury of the *Salon*. The press are decidedly in Rodin's favor. Roger Marx and others long ago pronounced him the first statuary of his time, and they were right. It is to the credit of these writers that it is now very difficult for conventional influences to kill a real artist in Paris. If Millet had lived in these days it would have been easier for him.

"We have never had a sculptor who is so intense as Rodin. Barye is often heavy, in spite of his power; perhaps, because of it. Carpeaux was sometimes careless in his impetuous rush for effect, and Fremiet, though the most distinguished mind in sculpture of modern times, and perhaps since many centuries, is sometimes almost dry.

"Do I think Rodin has had influence on the art of his country? Yes, a great influence, but in a quiet, though important way. He has already begun to cut a deeper mark upon his age than any other artist, and for these reasons: All the tendencies of his nature and work are natural and inspiring, just what all young and many old artists need, and have been long looking for. His work is nature, and that can be followed without fear or danger. It is the chief encouragement that students need, and it brings them the most joy in their studies. His work has an endless and safe attraction, a healthy stimulant.

"He was immediately felt and admired by the young artists and students at the School. He has a great many quiet followers. Barye, for one reason or another, did not touch the young. Neither does Fremiet. I don't speak of the School, for no great sculptors have come out of it. Great artists, like Barye, Fremiet, Chavannes and Millet, never have followers. They are landmarks to worship. Rodin is an exception. He has given an impetus, in the urging to a regard for individuality and the more serious study of nature, that no other of our artists has been able to give. He is very human and sympathetic, and free of all conventionalism. He is the only sculptor talked about by the students, and thought about by older men. He is an encourager to individuality.

"Not long ago I went to visit my old studio at the School, and the most important news the boys had to tell me was, that they had Rodin's old model. And this, years after he had got through with him.

"The audacious life and truth of Rodin's modelling has opened a good many eyes, of painters as well as sculptors. The fertility of his genius has been an inspiration to many.

"I said that his influence was quiet. It is so because the time has not yet come for those who are affected by him to speak openly in favor of such a revolutionary, nor to own allegiance to a force that is so antagonistic to the insipid conventionalism of the day. But they study nature harder than ever, and swear, in private, by Rodin.

"He has also a great many imitators, some of them men of ability, and although it is always a poor kind of art that is inspired or produced by the influence of any man, however great, deceiving only the ignorant, it shows that a new force is felt, and that some one is trying to improve on what he had previously done.

"If Rodin's influence is quiet, it is also slow, in a certain very significant sense. Slow, because, while his example is heartily acknowledged, his work is regarded, by many, as almost too strong and intense, and it will take a long time for it to be fully accepted. To any but very strong men his things are so great that they are demoralizing. The figures on the door are almost incredible. He is certainly one of the most varied and original sculptors in all art-history.

"After all, any serious consideration of French art-history must be made upon the basis of humanity, and not on that of nationality. The obstacles its artists have encountered, and the indifference and contumely they have suffered, must be set down to the discredit of common human nature, not to the imperfections of art organizations."

RODIN AS AN ARTIST.

The origin of "The Age of Brass," and "The St. John," show the simplest side of Rodin's art-nature, the figures on the door and the "Men of Calais" illustrate the intricate side, and reveal the full scope of his artistic and intellectual ability. The first, are the result of his earliest intimacy with nature, the last, of his capacity of analytical and synthetic examination, and his power of philosophical induction. In them is manifested the full round of his understanding, of the intricate relationship between the various emotions and their physical expression. They embody the complete programme of his loves and likes, in individual illustration and symbolism; and his feeling for geometrical arrangement, singly and in groups. Vivid as Rodin is in the artistic consideration of a subject, as especially shown in the figures on the door, his scientific leanings are now so strong that he works much from a geometrical point-of-view. Having become master of his art-instincts, he now ordains processes of working. He dreams, reflects, and organizes.

Rodin is original, without limit, clear and penetrating; generative and dramatic in his conceptive vision, delicate in sentiment, and rapid and powerful in execution. These qualities, pushed into activity by an unsurpassed intensity, have enabled him to produce a new world of sculpture. A new and strange one, a beautiful, fertile, and emotional world; startling, authorizing its own existence.

Rodin recognizes no filtered formula, however poetic or beautiful, he lives in the primitive domain of nature. The towering audacity of his personality is only equalled by his loyalty to what he has lived.

Not a decorative artist, like Michael Angelo, or Carpeaux, but more human than the first, and clearer than the last, the deepest seer of nature since Donatello. A terrible worker and a night-worker. Among rude men by day, at night a companion of the stars.

Reflecting no influence, and carrying the mark of no master. He corrected himself, and of himself became unconsciously possessed.

If it is necessary to class him, it would be among the Gothics.

With him, as with them, it is *life*, first and last.

He is an elemental force, a flow of new and reviving blood.

He has been called the Wagner of sculpture. If it is true that the great composer has exceeded all moderns in joining music to words in their highest relationship, then the comparison is just, for Rodin has knitted emotion and form together in equal intimacy. In this he has excelled all modern artists. By his knowledge of the human form he has gained the right to revel with the imagination in unrestrained liberty. He knows the sensibility of the nude, and adores it in all its details. His modelling is correct, expressive and rich. With him art has no age. Excuses he does not need, his faults, necessary ruins, have been his needed supports.

Rodin has also been called "the greatest living sculptor of *morceaux*," because his work has been hitherto confined to single figures, or groups of not more than two figures. He has not yet completed any compositions like that by Rude on the Arc de Triomphe, or those by Carpeaux on the Opéra, and Palace of the Tuileries. Great sonnets he has written in sculpture, but no epic poem, as the door is not complete.

Because of this, and in face of all that he has done, cautious critics suspend conclusive judgment. "Wait until the door is done," they say, "and we will determine his place and destiny."

The fact, that every one of the hundreds of figures made for the door are complete compositions of themselves, often representing all there is of a given sentiment, and that as a whole, they comprise the entire expression of human sorrow, and its attendant emotions, seems to have been forgotten by these timid friends of art. Even if these images were never put together in any composite correspondence, they would still form a logical, unique, though unconventional composition. So little does Rodin sympathise with the circumstances that have surrounded him during the past ten years, that to-day, in the full possession of his powers, his sole ambition is to re-live the time of "The Age of Brass;" to begin again to make a simple piece of sculpture without reference to subject, and independent of all intricate abstraction. To enjoy the pleasure of the soul as its emotion is passing out of the ends of his fingers into a piece of clay.

RODIN AS A MAN.

It has been well said by some unknown writer who visited Rodin's studio, that "If tribulation purifies and fortifies a man, Auguste Rodin ought to be an angel by this time, with the virility of a god. Yet he is a timid, tender nature, dreamy and given to abstraction. When you meet him he seems to descend from the clouds and to come from the assembly of the immortals. He looks at you with two large, soft, yet piercing blue eyes that excuse the necessity of an introduction. He is a small man, blonde, with a fluvial beard, short hair, beautiful hands, and very simple and direct in all his movements. His voice is low, very agreeable, and he uses the simplest language."

In height Rodin stands about five feet and seven inches, and weighs one hundred and forty pounds. His head is large, perceptives immense, line of forehead and nose almost pure Greek, prominent nose, and projecting well out. The forms around the eyes are large and fine, strong chin, and firm mouth. He is slightly short-sighted, and wears glasses. He talks art as he makes it.

Though living all his life in the studio, he is a keen, correct and large observer of men and things, and has gathered in the inevitable conclusions. He judges human nature as absolutely as he does art: on principle, mercilessly; on the score of sympathy, with the tenderness of a warm and considerative heart.

Fortunate in having neither taste for luxury, love of society, or care for the world's applause, he has been all the better able to endure the monstrous necessities of his early life, and the prostitution of every art-sensibility that he desired to keep pure while working for his bread. Though tormented by a turbulent imagination, his savage tenacity carried him safely through. Master of himself, never violating his own nature, he has preserved himself. He has escaped the turmoils and complexities of modern life, and enjoyed to its full the best of encouragement, the invariable censure of every one.

Fortunate, also, in escaping the falsities of any regular system of art-education, he has not been obliged to unlearn that which bad systems have taught. Traditions have never seriously affected him; confiding in himself, he went ahead, blindly, as he knew, but always ahead, surrendering nothing, conciliating none.

If the memory of the misery of the first forty years of his life has left so bitter an impression that now, when he is fairly comfortable, he can hardly realize the change, he makes no complaint nor finds fault with any. The philosophic healthfulness of his nature, the world of art, and the possession of the best of wives have long since confirmed him in the love of peace and work as the very boons of earthly comfort. Never dreaming of attaining any great excellence in his profession, or occupying a high position in the world, he has suffered no disappointments of ambition, and is content with the chances of good and bad as they have happened. Professional slights have never disheartened, nor misfortune or abuse frustrated him. He has run his race, thinking of and seeing nothing but his goal, the pleasure of work. In that he has found his highest happiness, and, as he joyously says, "My years have been thus spent in pure delight. Happiness is found in one's self; work brings it." With such a simple programme, Rodin has had, in the largest sense, the best of luck. Such a life is an ideal realism.

Rodin is bold, proud and simple. He has had something to say, and the good fortune to say it. Of nothing does he speak with so much warmth as of the hearty appreciation and continued friendship of his first art friends, who gathered around him in 1877–78–79. Those who have helped him when he needed help are "men of gold."

Rodin has always been a great reader, not of novels, but of Æschylus, Dante, Shakespeare and Lamartine. Always carries a book in his pocket. He cares nothing for dates, knows little as to when exhibitions of his works took place, and rarely saves a catalogue. Never writes anything except the shortest and most concise letters of business or friendship. Is extremely scrupulous in these matters, and as faithful and generous to his friends as he is exacting in his art. He has little respect for the average art-intelligence, but believes in individual effort. He views with no mild concern the increasingly prevailing and downward tendency of art at the present time; its disposition to cater to everything that is opposed to truth, serious study and good taste; its cowardly subservience to haste, love of money and vulgar luxury.

He thinks that the world is easily pleased, and that the day for great things in art has passed; that the nerve and heroism displayed by such men as Millet, Barye and Rude find little place in the souls of modern artists, and that even respect for the art-productions of other centuries has nearly died out. The modern urgency to have wide streets at the expense of destroying precious examples of architecture he regards as a sacrilege as unpardonable as it is unnecessary. Critical as he is of his own country, he still believes that it has not lost all its taste, and that, with proper effort, a great future of art awaits it.

Public and private appreciation of Rodin has been rapidly on the increase during the past few years. In 1887, his old enemy at Sèvres was discharged, and M. Deck was appointed in his stead. The latter, fully understanding the sculptor's merits, immediately invited him to resume the decoration of vases, free of all conditions, at his own studio, at his own pleasure, and at his own price.

In the same year, 1887, Rodin was appointed by the Minister of Fine Arts as one of the four sculptors who were to form a part of the State Art Commission for the great exposition of 1889.

In January, 1888, he received the long-delayed decoration of the Legion of Honor, through the influence of his old and ardent friend, Antonin Proust, former Minister of Fine Arts. Two banquets were given him in memory of this event: one by a select company of friends, and the other by eighty of the more distinguished artists and writers of Paris. The sculptor's praises were sung by no less than four poets on these occasions, and their words confirmed by orators and men of state. Perhaps the most significant tribute yet paid to Rodin was his election, by the sculptors of Paris, as a member of the jury of the *Salon* for 1888, and it may be safely asserted that as long as he shall act with that body the history of another "Age of Brass" will not be repeated.

T. H. BARTLETT.

[The end.]

SAFE BUILDING.[1] — XXVIII.

VOL. II. — I.

THE NATURE AND USES OF IRON AND STEEL.

THE introduction of the use of iron into the construction of buildings has practically revolutionized modern architecture; the introduction of steel promises to make equally great changes. The cost of these materials is comparatively so much greater than the ordinary materials used, such as brick and wood, and, again, the uniformity of their composition and strength is such, that in their use the smallest factors-of-safety are used; that is, the size of material used is very much more nearly equal to its ultimate strength than is the case when using cheaper or less uniform materials. Where, therefore, we "run so closely to the wind," it is essential that the nature and use of the material be thoroughly understood by the architect. Iron is used in three different kinds in building; namely, wrought-iron, steel, and cast-iron. Each has its uses and merits, and its disadvantages. All are really but iron in different combinations. Their differences depend mainly on the amount of carbon they contain. The more carbon, the more brittle, but harder is the iron. The less carbon, the more flexible and elastic, but softer is the iron.

Three Kinds of Iron.

Wrought or rolled iron is the softest, that is iron in its purest form. As it combines with itself a small amount of carbon, it becomes soft steel. The absorption of more carbon makes harder steel, until finally it becomes cast-iron. Pure or real metallic iron does not occur in nature, in commercial quantities, if at all. It is extracted from the various ores of iron, the chief of which are known as magnetite, red and brown hematite, limanite, siderite, etc., being various combinations of iron, with oxygen, forming oxides; of carbon and oxygen forming carbonates; and of hydrogen and oxygen forming hydrates. Other minerals, rich in iron ore, are found, but cannot be used in the manufacture of irons, on account of the large percentages of sulphur, copper, phosphorus and other substances they contain, which, if present in the finished product even to the smallest extent, render it unfit for most uses.

Iron Ores.

In the manufacture of pig-iron, the ore — or preferable an intelligent mixture of ores — after being broken in the stamping-mill, and washed in streams, and then roasted or calcined in kilns to remove the moisture and carbonic acid, is smelted in a blast furnance with the addition of coal or coke (or a mixture of both), as fuel, and limestone, or some substitute, as a "flux." The blast furnace itself is roughly of the form of an upright hollow cylinder, sometimes 100 feet high, but usually from 50 to 80 feet high and from 20 feet to 25 feet in diameter. The structure has a strong masonry foundation on which rest about

Manufacture of Pig-Iron.

Blast Furnace.

[1] Continued from page 5, No. 654.

eight cast or wrought iron columns, some 10 to 20 feet in height. These sustain a plate-iron casing enclosing the whole furnace from bottom to top. Inside, the furnace is of the shape of two truncated cones, placed base to base over each other, with a short cylinder at the bottom, being thus somewhat narrower at the top and bottom. The bottom of the furnace is called the "hearth;" about 5 feet to 7 feet above the hearth is the "crucible;" from hearth to crucible the furnace is cylindrical and from 6 feet to 12 feet diameter. From the crucible to the "bosh" which is some 20 feet to 30 feet above the hearth, the furnace enlarges to some 14 feet to 20 feet diameter, sometimes even 25 feet diameter. From here to the "throat" which is the extreme top, the furnace narrows down again, being some 10 feet to 15 feet diameter at the top. The furnace is lined inside with an infusible lining of fire-brick, and the charging of ore, flux and fuel is kept up constantly, and of course the fire and smelting process kept going, without stop, barring accidents, for many months at a time, and until this lining gives out; as a rule, the fire is continuous for from two to four years. The lower end of the furnace is closed save for an orifice at the bottom pierced through the walls about horizontally and known as the "hearth." In this pit the melted iron as it is reduced, being heavier than the flux, impurities or fuel, settles down and collects, until sufficient is obtained to justify the tapping or withdrawal of the plug from the orifice, when, of course, the pressure from above forces out the molten iron, which being thus withdrawn flows off through dikes and furrows in the sand of the casting-house floor. This tapping is done from three to four times every twenty-four hours. The main or feed channels through which the metal flows off directly from the furnace are known as the "sows"; at right angles to these, at frequent intervals, are the short furrows known as the "pigs." These are of convenient size for handling, and when cooled, are broken from the "sows" and form what is known in commerce as "pig-iron."

Hearth and Crucible.

Casting Pig-Iron.

Just under the crucible, that is, above the level to which the melted iron is allowed to rise in the hearth, or some 3½ feet to 6 feet above the hearth, there are from five to eight radial openings in the walls of the furnace admitting the "tuyères" which are blast nozzles, cooled by the circulation of water in them, and through which hot or cold air is forced horizontally into the blast furnace. The product is known accordingly as "hot blast" or "cold blast." The pressure under which this air has to be forced in, varies, according to circumstances, between 3 and 13 pounds per square inch.

Hot and Cold Blast.

As already remarked, the walls of the furnace widen out above this forming what is known as the "bosh" or the main body of the furnace. Above this the walls usually narrow down, the narrowing, however, depending upon the ore used or the product desired. This part is called the "stack." In the bosh and in the stack the distinctive phenomena of the blast-furnace mainly take place. The top where the walls always narrow down considerably, forming the "throat" of the furnace, is usually closed nowadays by a cone drawn up against a conical hopper, and only opened to allow of the charging of ore, flux and fuel, which is done in alternate layers, after lowering the cone a little. The cone, of course, being again drawn up tightly into place, after the charging. The furnace is kept constantly full to the throat, being charged as often as the material settles or is withdrawn. The charge usually consists, first, of from 1 to 3 tons of fuel — (coal, or coke, or both) — and then a mixture of ores in proportion of 1½ ton of ore to each ton of fuel. After this the limestone or flux is put in, being in weight from 40 per cent to 60 per cent of the ore. The materials are hoisted to the top in iron barrows by proper machinery. Where the tops of furnaces are kept closed, the blast — (or heated gases at the top) — is conducted off through flues immediately underneath and around the top. Part of these heated but otherwise waste gases are then passed through iron flues to the brick chambers, called "hot blast stoves," or around iron pipes, and serve to heat the "blast" or feed draught of the furnace, where a "hot blast" is used, thus saving fuel, increasing the output and effecting a considerable change in the nature of the pig-iron.

Charging Furnace.

Hot Blast.

The air for the hot blast is heated by passing it through the above mentioned iron pipes around which the gases play; or, where the brick chambers are used, the gases are turned into the chambers alternately, that is, one after another until the brick linings of one set of chambers are highly heated; the gases are then turned into the alternate set of chambers and the air to be used in the hot blast is admitted to the first set and becomes quickly heated to a temperature of from 900° to 1500° *F.* by contact with the hot bricks. As these cool the process is reversed, the alternate chambers being now used. These chambers are about 17 feet diameter, 60 feet high cylinders of plate-iron, made air-tight and lined with fire-brick. The interior being lined with a mass of intersecting flues of fire-brick. The balance of the hot gases which do not pass to these chambers are used to heat the boilers, which supply the necessary steam-power for the hoisting machinery, forced blasts, etc.

The process of smelting ores into pig-irons is, then, roughly this: The ore, flux and fuel are charged into the furnace from the top, in alternate layers at stated periods. A fierce fire is kept going and supplied with the necessary air (either hot or cold) for combustion at the bottom by means of a forced draught. As the above layers descend in the furnace they change their nature. The fuel gives out carbonic oxide which reduces the iron. The latter gradually separates from its impurities and combines with more or less carbon from the fuel. The ashes of the fuel and impurities of the ores combine with the flux (the melted limestone), and when all reaches the bottom we have the pure melted iron (with more or less carbon) at the very bottom or hearth; over this, in the crucible, float the melted flux and combined impurities; above come layers of less perfect iron, flux, partly-consumed fuel, and so on to the top. Before drawing off the melted iron at the bottom, the impurities and flux, known as the "slag," immediately above the melted iron, are first drawn off.[1]

Description of Process.

To be more technical in the above description, we should say that the ores of iron, whether oxides, carbonates or hydrates, are reduced either by their preparatory roasting or during their early passage down the top of the furnace shaft to the state of oxide of iron (ferric oxide).

Chemical Process.

The ensuing reaction in the furnace is, therefore, for all practical purposes, the reduction of this ferric oxide ($Fe_2 O_3$) when red hot by the action of carbonic oxide ($C O$) produced by the incomplete combustion of the fuel farther down the furnace. The iron gives up its oxygen to the carbonic oxide leaving metallic iron (which then takes up with some carbon) and carbonic dioxide ($C O_2$) which passes away in the waste gases. It should be noted here that pure metallic iron is infusible at the temperature obtainable in the blast-furnace. Its combination with carbon, however, to the extent of from 2 per cent to 5 per cent renders it easily fusible, and constitutes the pig or cast iron. Were it not for this fact the blast-furnace would be impracticable, as can be readily imagined.

The mission of the limestone or other fluxes, is mainly, when melted, to effect a more ready fusion or separation of the earthy impurities or "gangue" in the ore and to take up the ashy remnants of the fuel. It is found that the earthy bases are more fusible to an extraordinary degree when they are present together in numbers. Further, the addition of lime takes care of the silica present in the ores, which otherwise would unite with the iron, forming silicates of iron, which, though fusible, are difficult of reduction, and further prevent to a certain extent the taking up of carbon by the reduced iron, thus entailing a waste in two ways. The ordinary gangue or matrix of iron ore itself is clayey (argillaceous) or quartzose (silicious). The addition of lime or limestone (or dolomite) results in the formation of a "slag" which is readily fusible at the existing temperature. This slag, which when cold somewhat resembles bottle-glass, is much lighter than the molten iron, and as it collects above it, is drawn off just before casting from the surface of the melted iron in the hearth through openings placed at the proper level, just below the crucible.

Use of Flux.

To undertake to enumerate all of the brands of pig-iron used in casting would be an endless task. A few, however, may be here mentioned.

Brands of Pig-Iron.

Amongst those principally used in the New York market are:

Coltness, Summerlee, Shotts, Langloan, Dalmellington, Clyde, Eglinton, Glengarnock, Gartsherrie.	All Scotch irons: used as *softeners*, in connection with scrap-iron or lower grades of American pig-iron for cheap and inferior castings.
Cleator, Lowther, Lonsdale.	English Bessemers: are soft and strong and are used in place of best Scotch iron.
Manhattan, (New York), Low Moor, (Virginia), Thomas, (Penn.), Crane, (Penn.), Musconetcong, (Penn.), Sloss, (Alabama), Woodward, Spearman, Carbon, Granger, South Pittsburgh, Alice, Citico, Chattanooga, Hudson, Cold Spring, Sheridan, Leesport, Coleraine, Brier Hill, Secaucus, Castle, Poughkeepsie, Copley, Glendon, Andover, Taylor, Cornwall, Bethlehem, Stanhope, Allentown, Harry Clay, Harrisburg, Mill Creek.	All American brands.[2] The Manhattan is very fine; Secaucus and Castle are very strong; Thomas and Glendon are very popular and their Nos. 1 and 2 largely used for strong and good castings. The last three on the list are weak and soft cinder irons and are unfit for architectural uses, being used principally for stove-plates and pipe making.

All pig-irons are graded in three kinds, namely, Mill iron, Foundry iron and Bessemer[3] iron. Each of these is again subdivided into the following six grades:

Grading of Pig-Iron.

[1] This slag forms the basis of the "mineral wool," largely used for various purposes.

[2] For makers' names and addresses, see "The Directory of the Iron and Steel Works of the United States," published by the American Iron and Steel Association, 261 S. 4th Street, Philadelphia.

[3] Any foundry iron which is sufficiently low in phosphorus (not over 0,1 per cent) and silicon can be used in the Bessemer process.

No. 1.
No. 2.
No. 3.
Grey Forge.
Mottled.
White.

"No. 1" is the best and strongest, "No. 2" the next best, and so on to the "White," which is the poorest quality. Grey irons contain more graphitic carbon and are softer and more fusible than white irons, which contain more combined carbon, and are much harder and more brittle.

If the pig-iron on fracture is dark grey with spots it is soft and will run freely into the mould, making a good casting but not a strong one. Black specks, if present, mean carbon. If the carbon in the iron is chemically combined, it will show white metal, with no specks, on fracture, in which case the iron is very hard and brittle and will not flow easily into the mould, but will make a very strong casting.

For rolling or mill work the most used are the Nos. 2 and 3, Grey Forge and Mottled of the mill irons. For castings the most used are the Nos. 1, 2 and 3 and Grey Forge of foundry irons; the Mottled and White being usually sold for cheap mill-work.

For steel the iron should be as free as possible from phosphorus and sulphur, and the same, so far as possible, for rolled-iron. The presence of these makes iron fluid and soft and good for fine castings, but unfits it for rolling or forging.

Irons for mill and steel work are usually much stronger than for foundry work.

Scotch Softeners. Scotch irons are used in castings to make the melted iron more fluid, to soften it; but they greatly weaken the casting. For very fine castings, Coltness is the best and softest. For ordinary architectural castings, such as columns, lintels, etc., either Glengarnock or Eglinton (both Scotch irons) can be used; using one-third Scotch to two-thirds of some good American iron; using Nos. 1 and 2 of the latter in equal proportions.

Sloss (American) iron is now frequently used by good manufacturers as a softener in place of Scotch iron.

Strong Pig-Irons. For good and yet strong castings, use Thomas, Crane, Copley, Manhattan, Low Moor, Glendon or Coleraine. Add Sloss or Scotch for extra fine castings. Or add Glendon, Secausus or Castle for extra strong castings, using the No. 1 mill irons for the strongest work.

For rolled iron-work use Glendon, Andover, Taylor, Thomas, Stanhope, Allentown, Cornwall or Bethlehem. The latter two being used for steel.

There is a very strong and tough charcoal iron from South Carolina, but it is used mainly for car-wheels, being too expensive for ordinary work, other tough charcoal irons are made in many places from Michigan to Alabama.

In every case the better qualities (Nos. 1 and 2) will, of course, give the best results.

Unwin compiles (from a paper published by Mr. Turner in the *Transactions* of the Iron and Steel Institute of 1885) the following Tables of percentages, density and weight, for cast-iron:

TABLE XXVI.

ANALYSIS OF CAST IRONS.

	Combined Carbon.	Graphitic Carbon.	Silicon.
Greatest softness	0,15	3,1	2,5
" hardness	—	—	under 0,8
" general strength	0,50	2,8	1,42
" stiffness	—	—	1,0
" tensile strength	—	—	1,8
" crushing strength	over 1,0	under 2,6	about 0,8

TABLE XXVII.

DENSITIES AND WEIGHTS OF CAST IRONS.

MATERIAL.	Density.	Weight per cubic foot in lbs.
Dark-grey foundry-iron	6,80	425
Grey foundry-iron	7,20	450
Mottled foundry-iron	7,35	458
White iron	7,50	474

For wrought-iron Unwin gives this analysis:

Carbon 0,02 to 0,25 per cent; Manganese 0,0 to 0,3 per cent; Silicon 0,0 to 0,2 per cent; Sulphur 0,0 to 0,015 per cent; Phosphorus the same, and Pure Iron 99 to 99,5 per cent.

For steel, of course, the proportions vary greatly with the amount of carbon it contains. LOUIS DE COPPET BERG.

[To be continued.]

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

THE HORSES OF ITALIAN STATUES.

WASHINGTON, D. C., June 10, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — Your contributor in his admirable and interesting papers upon "Equestrian Monuments" remarks upon the family resemblance of the antique bronze horse ridden by the Marcus Aurelius of the Capitol and the horses of the Middle Ages under Colleoni and others. I remember that the Aurelius charger seemed to me very unsatisfactory till, seeing the monument itself at Rome, I had the opportunity to compare it with Roman horses used by Pius IX in his carriage and for mounting the Papal guard. I think it clear that these black horses are of the same stock as the one which served the sculptor of the Marcus Aurelius as a model. They differ greatly from the English blood horse, derived from the Barb by careful breeding. Yet it is to be remembered, in discussing the question, that the Romans of the Empire conquered and controlled for years the country of the Barb and of the Arab horse.

M. C. MEIGS.

NOTES AND CLIPPINGS

AN EMPIRICAL TEST FOR LEAD. — The minutest quantities of lead in potable waters may be detected by a simple method. The apparatus needed is an ordinary tumbler and two perfectly bright and clean knitting needles. Fill the glass nearly full of the water to be tested, and add eight or ten drops of acetic acid, or, in its absence, a teaspoonful of vinegar. If the water be quite turbid, double or even treble this quantity may be used. The needles should be carefully revolved occasionally. If lead be present in the minutest quantity, in the course of a short time dark or black spots will appear upon the needles, and in the course of six or eight hours the entire surface in contact with the water will be covered with a gray coating, the depth of color of which will depend upon the amount of lead in the fluid. From time to time a needle should be withdrawn and examined with a magnifying glass, if necessary, to determine whether or not a deposit is being formed. The same needle should be withdrawn each time, and one needle should be left in contact with the fluid three or four hours longer than the other. After removal they should be placed in a dust-free box and left for twenty-four hours, as in cases where the amount of lead is exceedingly small a deposit may be formed which cannot be immediately detected, but which after standing for twenty-four hours becomes very perceptible, the color being a yellow or reddish yellow. — *National Druggist.*

SOAPSTONE AND ITS USES. — Attention is being called to the unappreciated uses and preservative qualities of soapstone, a material which possesses what may be regarded as extraordinary qualities in withstanding atmospheric influences, those especially which have so much to do with the corrosion of iron and steel; it being a well-known fact that the inside of a steamer, which is not exposed to the action of salt-water, like the bottom, corrodes much more quickly than the outside. It has, too, an additional quality in this line, one which adapts it in a remarkable degree as a protective paint for ships, and this is the extreme fineness of its grain; indeed, ground soapstone is one of the finest materials producible, and from experiments made, it is found that no other material is capable of taking hold of the fibre of iron and steel so readily and firmly as this. It is also lighter than metallic pigments, and on this account, when mixed as a paint it is capable of covering a larger surface than zinc white, red lead or oxide of iron. In China, soapstone has long been largely used for preserving structures built of sandstone and other stones liable to crumble from the effect of the atmosphere, and the covering with powdered soapstone in the form of paint on some obelisks in that country composed of stone liable to atmospheric deterioration has been the means of preserving them intact for hundreds of years. — *Exchange.*

THE SAN DIEGO, CAL., FLUME. — It is claimed that the recently completed San Diego flume is the most stupendous ever constructed in the world, being only a little short of thirty-six miles long. An idea of the gigantic character of the work may be obtained from the fact that the amount of lumber consumed was more than nine millions of feet, or, allowing the very considerable yield of 1,000 feet to each tree, not less than 9,000 trees were required. In the course of the flume there are some 315 trestles, the longest of these being 1,700 feet in length, eighty-five feet high, and containing one-quarter of a million feet of lumber. Another trestle is of the same height, and 1,200 feet long, the main timbers used in both of these being ten by ten and eight by eight, being put together on the ground and raised to their position by horse-power. The number of tunnels in the course of the flume is eight, the longest of which is 2,100 feet, the tunnels being in size six by six feet, with convex-shaped roofing; each mile of the flume required an average of one-fourth of a million feet of lumber for its construction, and the redwood used entirely in the box is two inches in thickness throughout. — *Exchange.*

Silica in Iron Smelting.—Capt. G. G. Mullins, a retired officer of the regular army, is making efforts to introduce into the iron and steel foundries of Chicago an invention which, it is claimed, increases the working qualities, tensile strength, and resilience of the metal in its various forms. The novelty of the invention is the use of silica in the furnace. Silica has been considered a detriment to iron ores, and invention heretofore has striven to separate it from the metal rather than utilize it. Captain Mullins claims that the adverse agent is in reality silicon, the base of silica, and not silica itself. While silicon renders iron coarse in crystal, weaker and more brittle, silica properly applied has an opposite effect. In a pamphlet published by the company pushing his patents, the precise method of using the silica is not given, but effects are scheduled, which, if obtainable, should revolutionize the character of the iron and steel output. Prof. J. B. Johnson, civil engineer of the Washington University at St. Louis, is given by Captain Mullins as authority for the statement that the silica process produces a uniformity of structure, close-crystalled, and fine-grained to a degree not found in unsilicated iron; greater freedom from blowholes; a combined softness and toughness which better adapts the metal for the lathe; twenty-two per cent increase in tensile strength, and ninety per cent increase in resilience, or a power to withstand shock nearly double that of ordinary iron.—*Chicago Tribune.*

Haw Pond's Goings and Comings.—Haw Pond is about seventeen miles east of Cordele, and is perhaps one of the most wonderful natural curiosities in Georgia. It is situated in a low place, with hills on every side sloping down to it. Indeed, it is down hill for miles in going to the pond from any direction. Just at this time every year the water gradually goes down a few feet. Then there is a rush of water, a tremendous roar, and within a few minutes every drop of water disappears. This has happened for years, and it has never been known to prove a disappointment to those who go to witness the disappearance. Last Thursday about a dozen Cordelians left here for the pond. They carried fishing tackle in abundance, and spent a day and night catching any number of the finest specimens of the finny tribe. They met about fifty others who had gathered at the pond to fish and wait for the water to disappear. Where the fishermen dropped their lines to the depth of ten feet Thursday night, there was scarcely a drop of water Saturday morning. In a day the water had disappeared completely. For miles around the ground is said to be unstable and liable at any moment to sink. Only a few weeks ago the bottom dropped out, and now only the tops of the trees can be seen above ground. Every year large crowds from the surrounding county gather to witness the disappearance, and this year there were perhaps one hundred and fifty people there. In the fall, when there is rain in abundance, and the streams are full of water, Haw Pond fills up and waits for the springtime, when it disappears again.—*Atlanta Constitution.*

The Old Egyptian Encaustic Process.—In the older Egyptian mummies the face of the outer casing is usually modelled in relief, in a purely conventional way, but in this latest form of burial under the Roman Empire a portrait of the deceased was painted on a very thin piece of wood and then fixed over the dead face. It is very remarkable to find such fine coloring and skilful drawing in work of this late date, which must have been turned out of an ordinary undertaker's workshop. The portraits, both male and female, are most vivid and lifelike; the ladies are mostly dressed in a purple garment and the men in white, with a red orphrey. The modelling of the flesh is very skilful, and in some cases the coloring reminds one of the Venetian school from its rich depth of tone. A special point of interest about these paintings is their technical execution in the hot wax, or encaustic process, as it was called. The pigments were mixed with melted wax, and then fixed in their place by holding a charcoal brazier near the surface of the painting, as is described by Vitruvius. The somewhat lumpy *impasto* of the surface is due to the hardening of the melted wax when the brush touched the cold surface of the panel, and, owing to the non-absorbent nature of the wood, the subsequent application of heat was not able to drive the wax below the surface, as was the case with encaustic painting upon stucco. One of these portraits is noticeable from its ornamental framing with a flowing pattern, formed by pressing wooden stamps upon soft stucco, which was afterward gilt, a process exactly like that which was so often used to decorate mediæval pictures on panel, especially retables, or *ancone*, as the Venetians called them.—*The Saturday Review.*

TRADE SURVEYS

The strongest feature and most important tendency in the commercial and general business situation is the decided tendency of prices in the downward direction, notwithstanding all that has been said concerning recuperative agencies at work. In every direction, almost, symptoms of declining prices are observable. The forces at work in this direction are stronger than business men and financiers generally believe. Every week or so, elaborately-prepared articles appear in our trade and financial papers proving beyond the possibility of a doubt that at last and finally bottom prices have been reached, and that now is the most favorable time for parties who have money to invest in railway and other securities, and to put money in the various new enterprises. The outside public does not act upon these suggestions. Foreign capitalists show the same indisposition, or rather, suspiciousness. Throughout our own country everywhere this is at work to crowd prices still a little lower. As an indication of this in railroad securities, it is to be noted that commissioners of railroads have informed managers of all the railroads running through the State of Missouri that on June 25 they will be required to show cause why rates should not be reduced from ten to fifteen per cent after July 15. This action is the result of similar action taken some time ago in Iowa, Kansas and other Western States. The "Q" system has given notice that on Monday a reduction in rates upon its lines will go into effect. Lake Superior lines have also reduced rates. The Chicago & Alton has reduced rates on lumber to Missouri River points. Like reductions have also been enforced on several Southern roads and in some roads in the far East, notably in Ohio and Pennsylvania and New York. The explanation of this is simply that competition is working its way into railroad matters, as it has in all other directions. Railroad managers have for years maintained a belief that their arbitrary rates could be maintained, and they have disregarded more or less the appeals of shippers and the public generally. They would not permit fair rates. Recent reductions in prices clearly show that a remodelling of schedules will now take place throughout the country. The work will be done gradually, but no power can arrest it. One fact worth referring to in this survey is from the statements made by small manufacturers and shippers along lines of roads throughout the country, to the effect that the Interstate Commerce law is helping to build up little industries and little villages throughout the country, which development a few years ago was impossible. No harm is to be feared from the lowering of prices. The industries of the country are arranging themselves over again with reference to cost and production. New England manipulators largely controlled the boot and shoe trade. Massachusetts has no longer such influence, and it is not such an important factor in the paper trade. Wisconsin, Michigan, Indiana and other States are coming to the fore with mills with the finest equipments and with water-power in many cases, which reduces the cost of production way below any price thought probable a few years ago. The makers of paper-making machinery are reporting themselves unusually busy with contract work for new mills, and old mills have been compelled to adopt the policy of putting in new machinery, in order to prevent themselves from being crowded under. The manufacturers of hardware of all kinds, especially throughout the New England States, have begun to do a busy summer's work for the fall and winter. Contrary to the indications of last spring, jobbers and retailers are now stocking up with larger supplies of standard goods. Builders' hardware of all kinds, carriage-builders' and wagon-makers' materials have been in excellent request. In fact, carriage-builders, especially in the West, say that this season has been an exceptionally good one in all respects, excepting their margins on work. Throughout the New England States there is comparatively little just complaint among manufacturers. The textile mills are running very well. At Fall River, the dividends paid and the new factories projected and building show that the great industry there is in a healthy condition. Throughout the smaller towns and villages considerable new work is going on. Jobbers and commission-house men are advising a continuation of the conservative management of the past few months, but at the same time they feel much more hopeful than they did during March and April. The recent large auction sales at advancing prices have given confidence to the trade and to manufacturers. Another good indication is the fact that a great deal of American textile machinery is now under contract not only for mills in the South, but for mills in the New England States.

The hosiery manufacturers despite the sharp and bitter competition of European makers is guiding itself into new markets where competition is less hurtful, and the pioneers in the movement are achieving a success which shows that energetic enterprise is able to lead competition in the long run. There is nothing in the textile manufacturing situation that is actually discouraging. The woolen goods manufacturers expect to do a large business. The cotton-goods mills are now nearly all well employed. Stocks are now by no means unwieldy, and the consumption of goods in all sections of the country has not fallen below the average of recent years. On the contrary, the average has been exceeded. The manufacturers of machinery, of boilers, engines and implements, especially for agricultural use, have had an excellent season, and while the stocks of implements in Western distributing centres are large, the best authorities there do not believe that there will be any stocks left over after the buyers have come in. It is the intention of the farming interests of the West to extend their area, as it is the intention of the cotton-growers of the South to increase their cotton-producing territory. The fair prices for cereals, and the advancing prices for cotton, have served to strengthen confidence throughout the agricultural regions and elsewhere. A great deal of new Western and Southern territory has been opened up within the past twelve months. The old stories of the influx of capital into the West and South can only be told over again, so no very extended reference to it is necessary. The furnaces of the South are selling every ton of iron they can make. The daily consumption of crude and finished iron, of cheap dry-goods, and of shop and mill products generally, is growing with amazing rapidity in all the Western and Southern States. New industrial centres are springing up. Northern iron-makers dare not place prices up for iron without consulting the iron-men of the South. The Michigan and Wisconsin lumbermen cannot advance prices of lumber to Missouri River points without taking into account the movements and opinions of the lumber operators in Arkansas, Mississippi and Georgia. There is a centralizing process on one hand and a decentralizing process on the other hand. No one centre exercises the same controlling influence that it did a few years ago. Monongahela Valley coal is likely to be driven out of Missouri River points. The new coal developments all over the West are making industrial possibilities clear beyond the conception of the average newspaper-reader. While all these things are true, there are influences at work which call for more prudence. This is being shown by a great many business men. Occasional symptoms of a stringency in money have taken place recently, and dealers have failed because of the impossibility of collecting money to meet their obligations. Commercial agencies do not sound any alarm as yet over these difficulties, but the attention of commercial men and financiers is directed to the possibility of greater difficulties in the collection of debts and the settlement of accounts. The iron trade began to improve last week most unexpectedly. The chief strength was manifested in Pennsylvania, more particularly in Philadelphia. Finished iron has been advanced nominally $2 per ton. Steel-rails are held at 50 cents higher than a week ago. Crude iron has not been advanced, for notwithstanding the fact Southern iron might be crowded in under any advance. There is an enlarged demand and a wider inquiry in nearly all Eastern markets between Boston and St. Louis. Heavy lumber shipments continue from Chicago, Savannah and Mobile to Eastern markets. The great disaster in Pennsylvania will call for immense quantities of lumber, iron and steel, as well as a vast quantity of mill and shop products. Some thirty to forty bridges of considerable size were lost in that catastrophe, besides cars, locomotives, shop equipments, tools and machinery without estimate. The Cambria Iron Works were not as badly damaged as first supposed, and it is thought that nearly all departments of this works will be in operation by the 1st of July. Last week the steel rail allotment was increased 200,000 tons. Railroad-builders have not yet begun active work, but probably will in July; but, it is not yet too late for some surprises in this direction. Mining operations in nearly one-half of the anthracite coal fields of Pennsylvania were temporarily suspended by floods, but work will be resumed next week in many mines.

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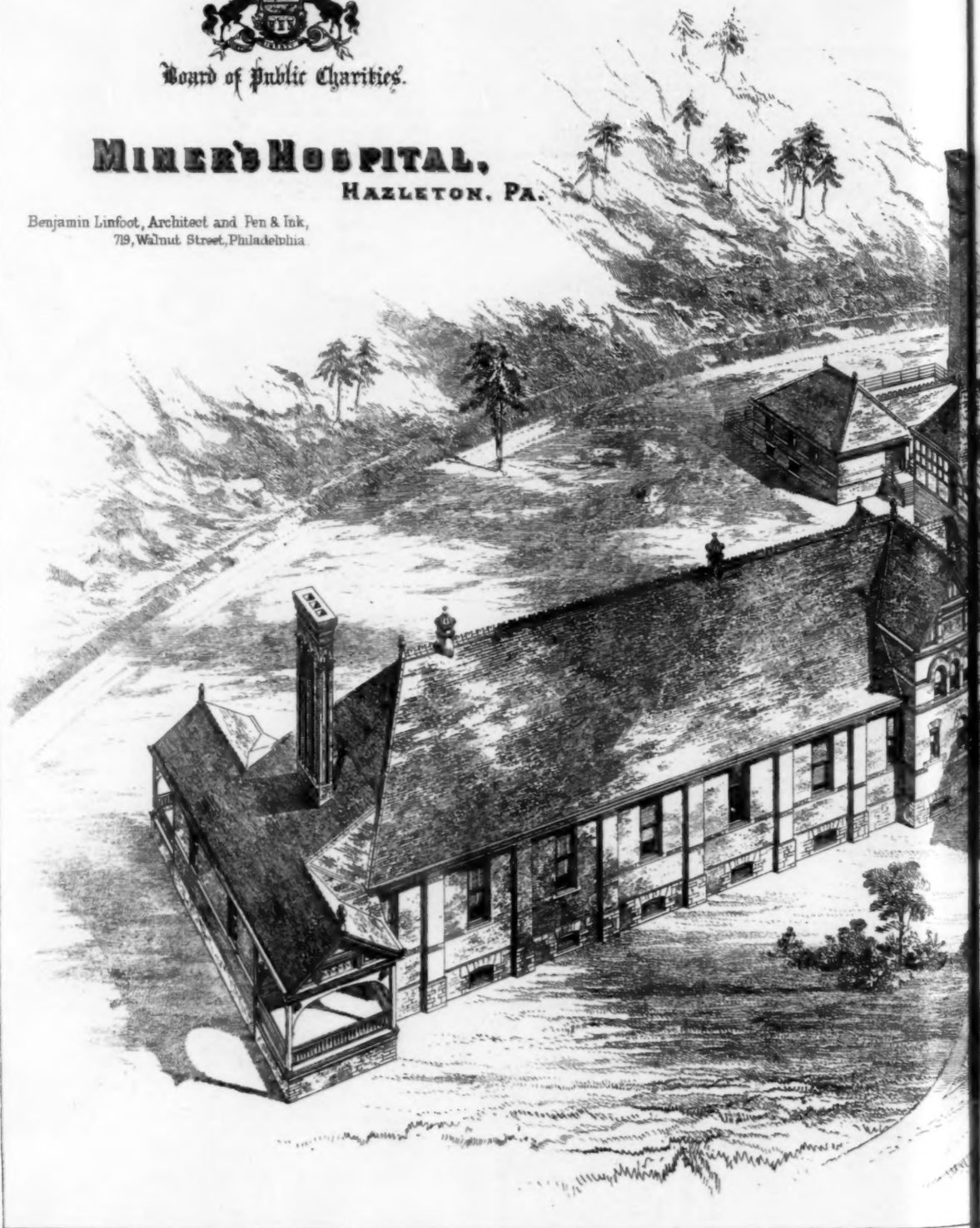

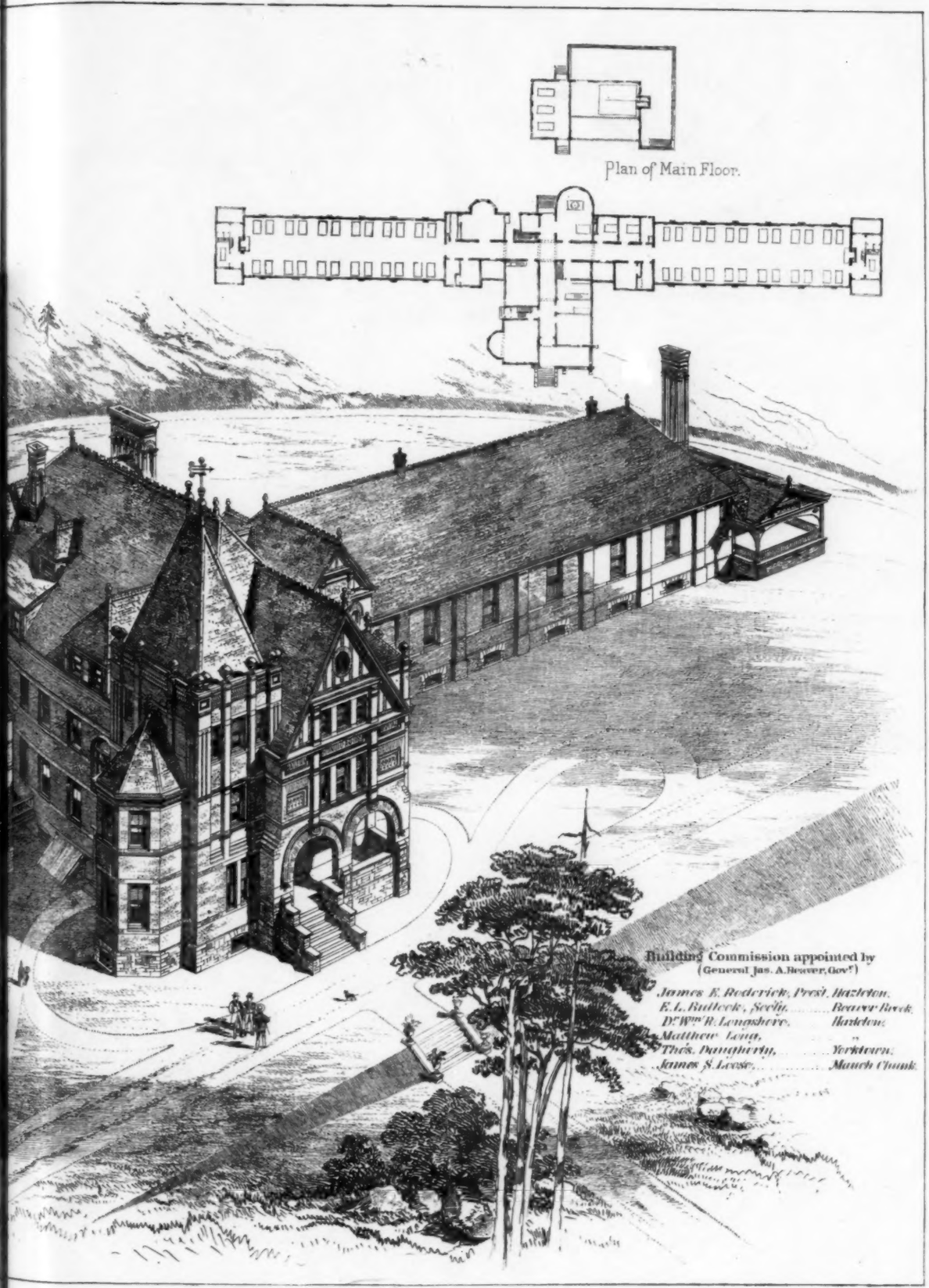
Plan of Main Floor.
Building Commission appointed by
(General Jas. A. Beaver, Gov.r)
James E. Roderick, Prest. Hazleton.
E. L. Bullock, Secty. Beaver Brook.
Dr. Wm R. Longshore, Hazleton.
Matthew Long, "
Thos. Dougherty, Yorktown.
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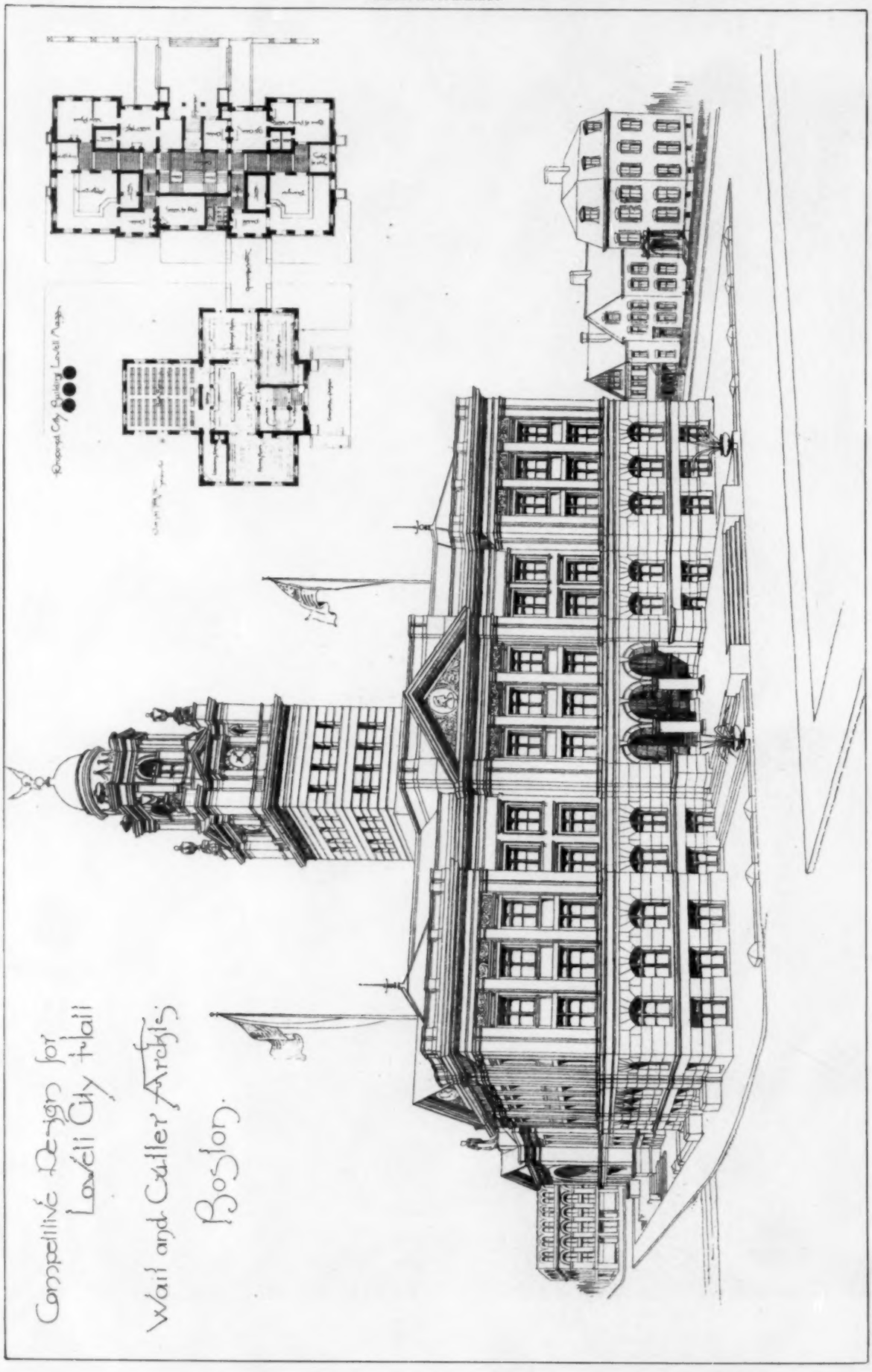

Competitive Design for Lowell City Hall

Ware and Cutler Architects

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PART OF THE DOOR.

M. RODIN, SCULPTOR.

MME. MORLA.

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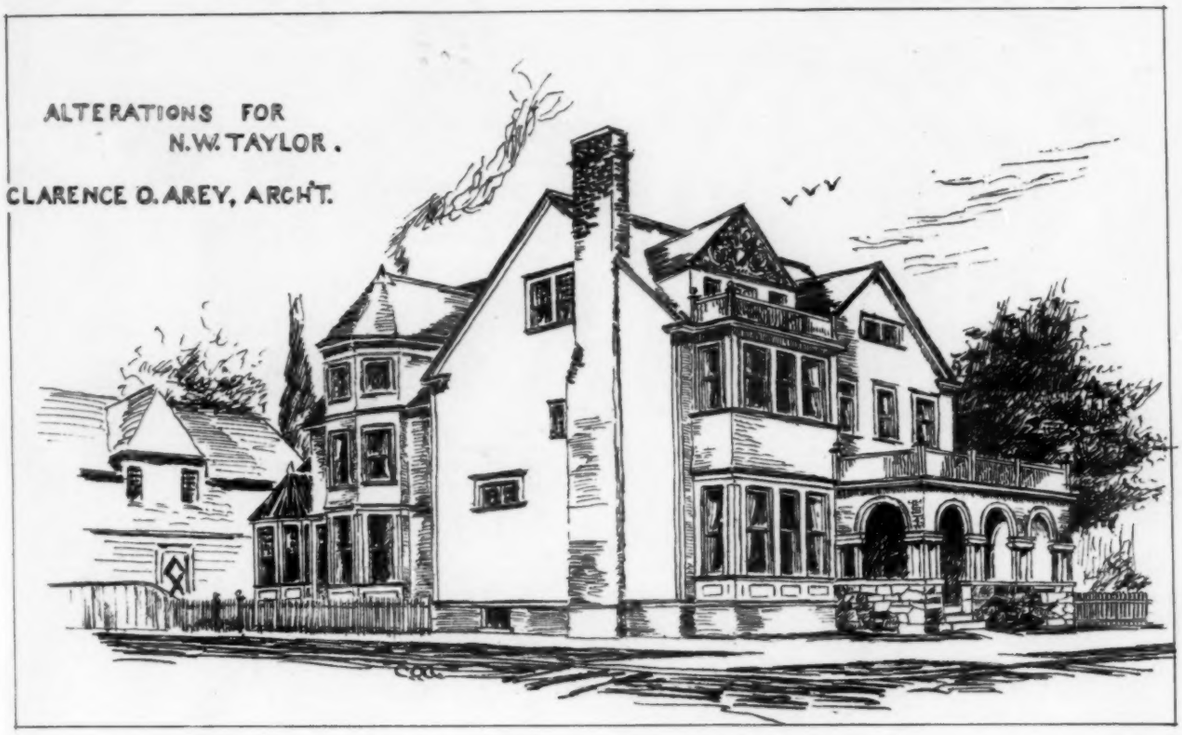

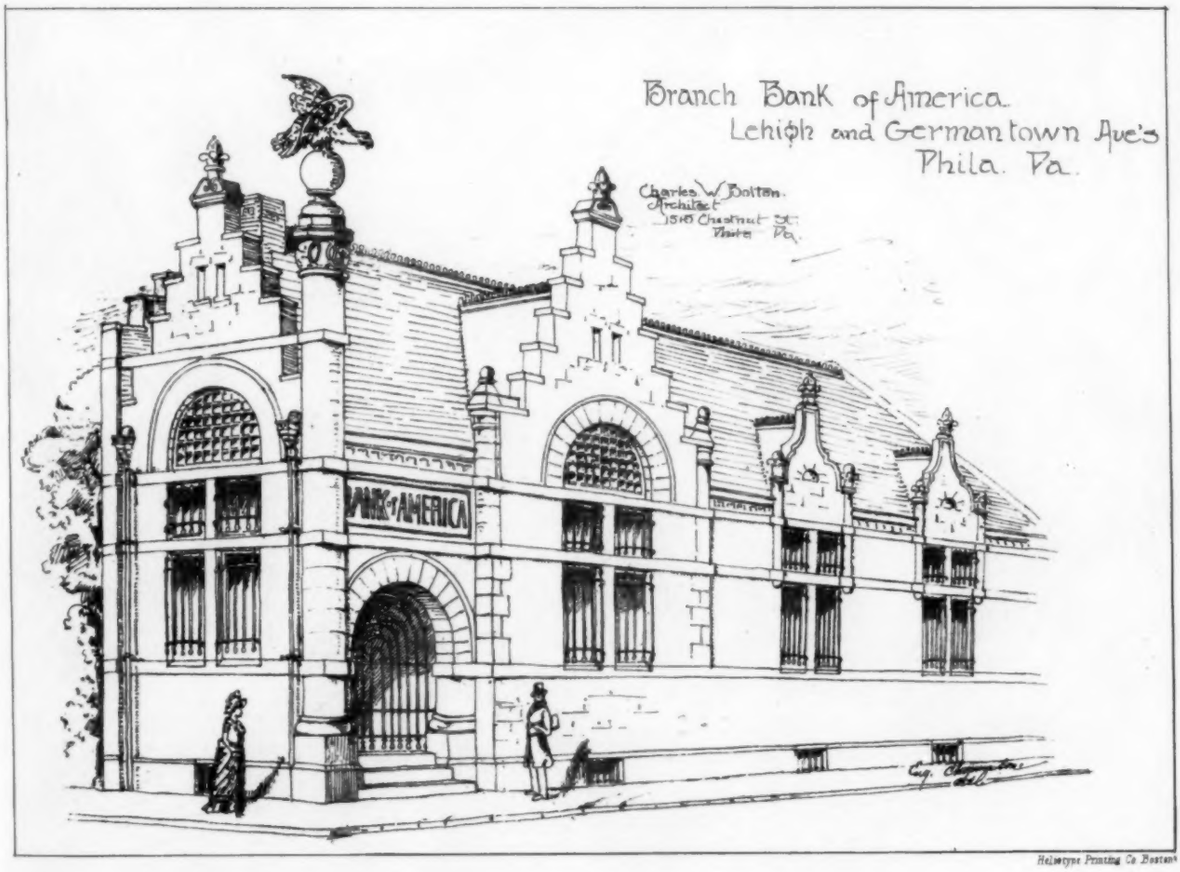

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